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ABSTRACT

This report examines the matrix of support patterns of science and engineering doctorates in 1995, showing the distribution of various modes of support to individuals. The data provided in this report are intended to be a source of contextual and background information for those interested in examining the various types of graduate support modes and assessing the impacts of support modes on graduate education outcomes. The data in this study show the complexity of support mechanisms and thus the limitations of analyses of the effects of only a single mode of support. The document includes an executive summary, an introduction with background explanations, analysis of the numbers of support modes used, analysis of the prevalence and combinations of support modes, concluding remarks, and technical notes. (Contains 14 references.) (WRM)

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Modes of Financial Support in the Graduate Education of Science and Engineering Doctorate Recipients

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Topical Report

Division of Science Resources Studies
Directorate for Social, Behavioral, and Economic Sciences
National Science Foundation

May 2000

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Modes of Financial Support in the Graduate Education of Science and Engineering Doctorate Recipients

Topical Report

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National Science Foundation

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CONTENTS

Section *Page*

EXECUTIVE SUMMARY vii

Number of Support Modes Used vii
Prevalence of Modes of Support vii
Combinations of Modes of Support viii

INTRODUCTION 1

Reasons for Interest in Graduate Student Support 1
U.S. S&E Graduate Education 1
The Government Performance and Results Act 2
Study Data: Strengths and Limitations 2
Organization of This Report 3

NUMBERS OF SUPPORT MODES USED 5

Modes of Support 5
Primary Mode of Support 6
Secondary Mode of Support 9
Number of Support Modes by Sex 9
Number of Support Modes by Race/Ethnicity and Citizenship 10
Number of Support Modes by Control and Research Emphasis of Institutions 10

PREVALENCE AND COMBINATIONS OF SUPPORT MODES 15

Sex, Race/Ethnicity, and Citizenship 16
Sex 16
Race/Ethnicity and Citizenship Status 16
Institutional Characteristics 25
Institutional Control 26
Carnegie Institutional Classification 28

CONCLUSION 31

REFERENCES 33

APPENDIX A – TECHNICAL NOTES A-1

Survey Description A-1
Missing Data A-1
Validity of Data on Sources of Support A-1
Data Recodes A-1
Exhibit A
Exhibit B

Executive Summary

The purpose of this report is to examine the matrix of support patterns of science and engineering (S&E) doctorates in 1995,[1] showing the distribution of various modes of support to individuals. The data provided in this report are intended to be a source of contextual and background information for those interested in examining the various types of graduate support modes and in assessing the impacts of support modes on graduate education outcomes. The data in this study show the complexity of support mechanisms and thus the limitations of analyses of the effects of only a single mode of support.

The analysis in this report is based on the Survey of Earned Doctorates (SED). SED collects data from doctorate recipients at the time of their Ph.D. conferral regarding primary, secondary, and all other modes of support used over the course of graduate study, as well as information on individual and institutional characteristics. The following highlights some of the main results of the study.

Number of Support Modes Used

New S&E Ph.D.s commonly used more than one mode of support during graduate school. Only 16 percent of 1995 S&E Ph.D. recipients reported using one mode of support and more than 40 percent used 3 or more modes of support. The average number of modes of support reported by these recipients was 2.5. Numbers of modes of support varied by field, sex, race/ethnicity,[2] and citizenship. For example, 72 percent of those in the agricultural sciences, but only 44 percent of those in psychology, used one or two support modes. On average, women reported more support modes than men in S&E as a whole and within most fields. Asians and foreign students, on average, reported fewer modes of support than did other groups.

Although the number of support modes did not vary by institutional control (public/private), it did vary by the research emphasis of the institution. In every field except earth, atmospheric and ocean sciences, students receiving doctorate degrees from Carnegie Research I (Research I)[3] institutions were more likely than those receiving their degrees from other institutions to report use of more than one mode of support.

Prevalence of Modes of Support

S&E Ph.D. recipients in 1995 reported greater use of research assistantships (RAs) (66 percent) than any other support mode in many fields. Exceptions were the health sciences, mathematics, psychology, and the social sciences. In the health sciences, psychology, and the social sciences, use of one's own funds was the most frequently cited support mode; in mathematics, it was teaching assistantships (TAs). Fellowships,[4] traineeships,[5] and loans were less frequently cited modes of support in S&E as a whole.

Among 1995 S&E Ph.D. recipients, women were more likely than men to report using fellowships, traineeships, their own funds, or loans as a mode of support. Men were more likely than women to have received support in the form of RAs. However, some of these aggregate differences between women's and men's support modes are related to differences in field of doctorate.

As in differences in support modes cited by men and women, some of the aggregate variations across racial/ethnic groups also reflect field differences. However, field differences do not explain all of the racial/ethnic variations in modes of support. Asians reported using RAs with greater frequency than other groups in every field except computer and information sciences and psychology.[6]

[1] Throughout this report, the terms science and engineering doctorates and science and engineering Ph.D.s refer to research doctorates in agricultural sciences; biological sciences; computer & information sciences; mathematics; physical sciences; earth, atmospheric, & ocean sciences; psychology; social sciences; and engineering, as well as the health sciences (e.g., environmental health, nursing, pharmacy, and veterinary medicine). Although this study examined support patterns in 1995, more recent data are currently available (see NSF 1999a.).

[2] Race/ethnicity and citizenship are aggregated into the following categories: U.S. citizens and permanent residents who are further subdivided as: Asians (Asians or Pacific Islanders), underrepresented minorities (black non-Hispanics; Hispanics, and American Indians or Alaskan Natives), and white non-Hispanics; and foreign students (defined here as persons on temporary visas at the time of receipt of the Ph.D.).

[3] See the definitions of Research I and all other Carnegie-classified institutions in appendix A.

[4] Fellowships are here described as nationally competitive awards granted directly by the sponsoring organization to a student.

[5] Traineeships are here considered to be those awards that are not nationally competitive and that are awarded by individual academic departments or institutions rather than by a sponsoring organization.

[6] The Chinese Student Protection Act of 1992 allowed Chinese students to apply for permanent residency in 1993. Three-quarters of the U.S. citizen and permanent resident Asians receiving S&E Ph.D.s in 1995 were permanent residents and 77 percent of those permanent residents were from the People's Republic of China. Thus, a large proportion of the U.S. citizen and permanent resident Asians receiving S&E Ph.D.s in 1995 were Chinese who may have entered graduate school as temporary residents and were therefore ineligible for modes of support that required U.S. citizenship or permanent residency.

In every field, a larger percentage of both underrepresented minorities and whites reported using their own funds and loans than did either Asians or foreign students. Also in every field, higher percentages of underrepresented minorities than of other groups reported using traineeships. In all fields but earth, atmospheric, and ocean sciences, higher percentages of underrepresented minorities than of other groups reported using fellowships.

Little difference existed in support patterns reported by new S&E Ph.D.s in public and private institutions. However, those with doctorates from Research I institutions—the Nation's largest research performing universities—did differ notably from those in other types of academic institutions. New S&E Ph.D.s from Research I institutions were more likely to report use of RAs, and less likely to report use of their own funds, than were new Ph.D.s from all other institutions. In addition, they were also somewhat more likely to have held fellowships or traineeships or to have served as teaching assistants.

Combinations of Modes of Support

Five combinations of support modes out of a possible 127 were reported by just under 40 percent of the 1995 S&E Ph.D. recipients. Two combinations—RA + TA[7] and RA + own funds—accounted for about 20 percent of all combinations of modes. RA + TA + own funds and RA alone were the third and fourth most frequent combinations. TA + own funds was the fifth most frequently used combination of support modes.

In most fields, i.e., engineering, the social sciences, computer and information sciences, physical sciences, and biological sciences, predominant combinations of support modes do not differ greatly by sex. However, differences are apparent in a few fields. For example, in the health sciences, 12 percent of women, but only 6 percent of men, reported using their own funds as their only mode of support. In mathematics, women and men have the same top four combinations of support, but for men the predominant combination was RA + TA; for women, TA + own funds. In the earth, atmospheric, and ocean sciences, women and men reported the same top four combinations; but the predominant combination for women was RA + TA + own funds, that for men was RA + own funds.

Combinations of support modes also differed by race/ethnicity. Each of the top five support combinations for underrepresented minorities involved the use of own resources, but their top five support modes involved only 22 percent of underrepresented minority Ph.D. recipients; for Asians and foreign students, their top five accounted for about 60 percent each. In fact, just under 40 percent of those of Asian background received their support from two sets of combinations: either the RA + TA combination or RA alone.

Four of the top five combinations of support modes were the same for new S&E Ph.D.s from both public and private institutions, with only the order and level varying. The top five combinations in private institutions were used by 33 percent of the doctoral recipients compared with 43 percent in public institutions.

The Nation's major research—Research I—universities and other types of academic institutions also shared four of the top five combinations of support modes for new S&E Ph.D.s.

[7]Order does not imply anything in combinations of support modes, i.e., RA + TA is the same as TA + RA.

INTRODUCTION

REASONS FOR INTEREST IN GRADUATE STUDENT SUPPORT

Two main developments underlie the current policy interest in graduate student support. One is a growing concern that graduate science and engineering* (S&E) education in the United States is too narrowly focused to be able to meet the needs of the student or the workplace. The second is the increasing call for greater accountability by Federal agencies as exemplified in the Government Performance and Results Act of 1993 (GPRA). These developments have increased the attention paid to the outcomes of graduate student support and the mechanisms through which it is administered. This report focuses on the latter issue—the modes of financial support.

Many analyses relating to graduate financial support have focused solely on students' *primary* support (COSEPUP 1995, NSF 1996b, NSB 1998, NSF 1998a). But in fact, most graduate students tend to use multiple modes of support over the course of their doctoral studies, making it difficult to rely only on a clear primary or secondary support mode for information on their financial support. Therefore, those examining the efficacy of various support modes should be aware of and take into account the multiple modes of support. They should also be aware of the extent to which such support modes vary by characteristics such as field, sex, race/ethnicity, and citizenship status of S&E doctorate recipients and the type of institution from which they received their doctorates. The purpose of this report is to examine the entire range of support patterns of S&E doctorates, showing the distribution of various modes of support to individuals. The analysis partitions data by a number of individual and institutional characteristics. The objective of the study is to provide contextual and background information about the nature of graduate financial support to those thinking either about the impacts of support modes on graduate S&E education or how to evaluate the impacts of specific graduate support programs for GPRA purposes.

*Throughout this report, the terms science and engineering doctorates and science and engineering Ph.D.s refer to research doctorates in agricultural sciences, biological sciences, computer and information sciences, mathematics, physical sciences, earth, atmospheric, and ocean sciences, psychology, social sciences, and engineering, as well as the health sciences (e.g., environmental health, nursing, pharmacy, and veterinary medicine).

U.S. S&E GRADUATE EDUCATION

In recent years, policy makers, academics, and other interested parties have been examining the changes in science and technology, employer needs, demographics, and the international environment, with an eye to the adjustments these may require in the U.S. graduate education system (COSEPUP 1995, NSB 1996, NSF 1996a, AAU 1998). Among the most frequently made recommendations are the following:

- broader and less specialized training;
- shorter time-to-degree;
- increased experience in nonacademic settings;
- improved communication skills;
- greater ability to work in teams;
- heightened awareness of possible career choices, particularly of the options available outside academia; and
- greater focus on attraction and retention in higher education of underrepresented minorities.

In these discussions, graduate support modes—that is, the various ways in which graduate students are supported financially—are often viewed as helping or hindering the achievement of many of these recommendations. A report by the National Academy of Sciences' Committee on Science, Engineering, and Public Policy (1995), *Reshaping the Graduate Education of Scientists and Engineers*, focused on Ph.D.s and discussed the changing context of graduate education, employment trends and prospects for graduate scientists and engineers, the impacts of sizeable populations of foreign students, time to employment, and information needs. The report indicated that research assistantships had become the dominant mode of Federal support for graduate students, but cited several drawbacks to this dependence on research grants. A major recommendation was that government agencies should adjust their support and include new education/training grants to institutions and departments.

The National Science Board Task Force on Graduate Education, established in 1995, examined the merits and mix of the several modes of funding support (i.e., research assistantships, fellowships, traineeships) used by the National Science Foundation (NSF) and their impacts on graduate students' experience and preparation. The task force determined that data were insufficient to

support recommendations for major revisions in the mix of NSF funding. The report concluded that:

- limited studies should be conducted on alternative modes of graduate support, with defined goals and assessment criteria; and
- data collection and/or research on funding mechanisms and their influence on various aspects of graduate student education and employment should be supported.

The Government Performance and Results Act

Congress passed the Government Performance and Results Act (GPRA) of 1993. GPRA aims to shift the focus of Federal agencies away from traditional concerns, such as staffing and the level of services provided, and toward the achievement of stipulated results of government programs and activities. GPRA requires every Federal agency to prepare multiyear strategic plans and annual performance plans and reports. These documents are intended to give agencies formal tools with which to set forth goals, prepare plans to meet those goals, and to assess and measure progress and accomplishments.

As part of GPRA, every Federal agency is expected to provide information about the outputs and outcomes of its activities. Graduate education is one such activity for NSF: a key investment strategy in its broader outcome goal for a diverse, globally-oriented workforce of scientists and engineers. NSF supports graduate students directly through graduate fellowships and traineeships and indirectly through research assistantships as part of NSF grants. This study provides contextual information that can be used by those responsible for assessing the impacts of specific programs relating to graduate support for GPRA purposes.

Study Data: Strengths and Limitations

NSF has two annual sources of data on graduate support patterns—the Survey of Graduate Students and Postdoctorates in Science and Engineering (GSS) and the Survey of Earned Doctorates (SED). However, GSS collects data on full-time S&E graduate students' primary support mode only from academic departments. SED collects data directly from doctorate recipients at the time of Ph.D. conferral regarding primary, secondary, and all other modes of support used over the course of graduate study. Thus, only SED data are used in this report. Almost the entire report is based on the 1995 responses of 27,865 recipients of a science or engineering doctorate. However, the beginning of chapter 2 contains some references to 1986 SED data for comparison purposes.

The SED is a universe survey of all recipients of research doctorates in the United States. The data are representative only of doctorate recipients, not of all graduate students. The SED is the only national source of data on modes of support, which is asked of every individual receiving a research doctorate in the United States. The response rate to the survey is high—94.3 percent in 1995. The response rate for mode of support was 94 percent, but only 76 percent report a primary source of support and 63 percent a secondary source.[9] Because this is not a sample survey, results are not subject to sampling error, thus statistical significance is not an issue. Results are subject, however, to nonsampling error, for example, underreporting of primary and secondary mode of support. Profiles of nonrespondents are available in appendix tables A2 and A3.

A further point to note is that neither of the two surveys collects information on dollar amounts of support. Thus, the report focuses on the number or percentage of new Ph.D.s reporting use of a particular mode or combination of modes of support. The reader should bear in mind that changes in modes of support over time or differences among groups in types or combinations of support modes do not necessarily imply changes or differences in amounts of funding.[10] The decrease in use of loans from 1986 to 1995, for example, does not imply a decrease in the amount of debt.[11]

Although this study examines demographic and institutional factors that may affect support patterns, other factors not considered here may influence the nature of

[9]After 1995, the questionnaire form was changed to obtain a higher response rate. In 1996, the response rate to primary and secondary support rose to 87.9 and 76.1 percent, respectively.

[10]Another report, relying on the National Center for Education Statistics' National Postsecondary Study Aid Study, addresses the financial aid profile of graduate students enrolled at master's and doctoral levels. See NSF, *Financial Aid Profile of Graduate Students in Science and Engineering*, forthcoming.

[11]For information about indebtedness at the time of receipt of the doctorate, see the two NSF issue briefs dealing with this issue (NSF 1998b and NSF 1999b).

support patterns or may interact with some of the attributes being examined in this study to affect support patterns. Such other factors include age of doctorate recipients, geographical location of institution from which degree is received, and part-time/full-time status of students.

Organization of This Report

Chapter 2 introduces and defines the seven distinct modes of financial support examined in this study and reports on the frequency with which each of these is reported as a primary, secondary, or any mode of support by S&E Ph.D. recipients. The chapter's main focus is the *number* of support modes used. It examines this variable, by broad field of study, for 1995 S&E Ph.D.s as a whole as well as by sex, race/ethnicity and citizenship, public versus private institutions, and Carnegie Research I (Research I) institutions vs. other institutions.[12] Chapter 3 looks at *combinations* of support modes and examines how these combinations vary with field of study and the other analytical categories employed in chapter 2. Chapter 3 also presents information on the percentage of 1995 S&E Ph.D.s reporting each of the seven support modes as one of their modes of support, or as their primary mode of support.

Appendix A – Technical Notes contains a detailed description of the survey, variables, and data used.

[12]See the definitions of Research I and all other Carnegie-classified institutions in appendix A.

NUMBERS OF SUPPORT MODES USED

MODES OF SUPPORT

The methods used to fund graduate education are diverse. In the 1995 SED survey, new Ph.D.s were asked to select, from among 32 separate support choices, those that they may have used during graduate school. In this study, those 32 possible options have been combined into 7 distinct modes of support;[13] these are listed below and described in the text box:

- fellowships,[14]
- traineeships,
- research assistantships (RAs),
- teaching assistantships (TAs),
- own funds,
- loans, and
- other.

Respondents to the 1995 SED used all of the 127 possible combinations of these seven modes of support; respondents to the 1986 SED used 125. As would be expected, not all combinations are evenly distributed among the respondents. For example, in 1995 only one person used a combination of fellowship, traineeship, RA, loan, and other; 2,703 used a combination of RA and TA. (The combinations of support patterns are discussed in greater detail in chapter 3.) In 1995, 58 percent of all respondents reported a total of either one or two modes of support, compared to only 49 percent in 1986 (table 1).

Table 2 shows the incidence of funding modes for 1986 and 1995. Use of traineeships declined from 30 to 21 percent, use of own funds from 70 to 61 percent, and use of loans from 29 to 20 percent. The use of RAs, on the other hand, increased from 56 percent in 1986 to 66 percent in 1995. Changing demographics contribute to some of this shift in use of RAs. In 1986, 21 percent of S&E Ph.D. recipients were foreign students on temporary visas. By 1995, this amount rose to 26 percent. (NSF 1996c.) Because they often do not qualify for Federal loans in this country, they tend to rely more heavily on RAs. Interestingly, in either time period, there were only

[13]See question 17 of the questionnaire in Appendix A for the 32 support choices. See page A-2 of Appendix A for the grouping of these 32 choices into the 7 modes of support. The emphasis on modes rather than on sources was chosen because validation studies of the SED showed that students frequently misreport the source (e.g., Federal, nonfederal) of their financial support, but that they can accurately identify the modes. (NRC 1994)

[14]Note that fellowships are nationally competitive awards. University fellowships are included under traineeships.

Definitions and Terminology

- **Fellowships** are here described as nationally competitive awards granted directly by the sponsoring organization to a student, such as fellowships from the Ford Foundation; Mellon Foundation; Rockefeller Foundation; Alcohol, Drug Abuse and Mental Health Administration; NSF; U.S. Department of Agriculture (USDA); and Fulbright Foundation. Also included are other fellowships such as Woodrow Wilson, Danforth, Hertz, Earhard, and African Graduate Fellowship Program fellowships.

- **Traineeships** are here considered to be those awards that are not nationally competitive and that are awarded by individual academic departments or institutions rather than by a sponsoring organization. These include university or university-related fellowships; National Institutes of Health (NIH) fellowships; and other Federal support such as Patricia Roberts Harris, Title IV Foreign Language, and National Defense Education Act fellowships.

- **Research assistantships** include university-related research assistantships and Federal research assistantships such as those provided by NIH, NSF, USDA, and other agencies.

- **Teaching assistantships** include university-related teaching assistantships.

- **Own funds** include resources from a student's own earnings, spouse's earnings, and family contributions.

- **Loans** include student loans such as guaranteed student loans, Perkins loans, and other loans.

- **Other sources include** Federal support from the Departments of Health and Human Services, Education, and Veterans Affairs; the National Endowment for the Humanities; other government departments and agencies; university-related college work study and other university-related funding; business or employer funds; support from foreign governments, and support from state governments.

small differences reported in the use of particular support modes as either primary or secondary modes, except for the case of RAs, which more commonly provided primary than secondary support, and own funds and loans, which more commonly provided secondary support. However, because the number of graduate students has increased, more students are using any one specific mode.

Although some change is apparent between 1986 and 1995, it is small enough that this report will not address such variations. Also, since there is such a small percent of S&E Ph.D.s (less than 1 percent) using more than five modes, the report will consider only students using five or fewer modes in most tables reporting number of funding modes.

There is considerable variation in the number of modes of funding used in different S&E fields. Table 3 shows, for example, that more than one-quarter of those in the agricultural sciences used only one support mode, and nearly three-quarters used one or two modes. In contrast, only 44 percent of those in psychology were covered by one or two modes. The average number of modes of support varies from 2.1 for the agricultural sciences to 2.9 for the social sciences, with an overall mean of 2.5 (table 4). The variation in number of support modes by field (as well as by sex, race/ethnicity, and citizenship) suggests that a "one size fits all" policy to influence graduate support patterns may not be appropriate. For instance, for groups characterized by a large number of funding modes, emphasis on one specific mode of support may have less effect than on a group characterized by one predominant mode of funding.

Primary Mode of Support

1995 S&E Ph.D.s reported use of RAs (38 percent) than any other primary support mode (table 5). This was the case in all fields except the health sciences, math-

Table 1. Percentages of 1986 and 1995 S&E Ph.D. recipients using various numbers of support modes

Year	Number of S&E Ph.D.s	Number of support modes						
		1	2	3	4	5	6	7
1986	20,207	13	36	27	16	6	1	< 1
1995	27,865	16	42	24	13	4	1	< 1

NOTE: Rows may not total 100 percent due to rounding.
Percentages are based on those reporting at least one mode of support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Table 2. Percentages of 1986 and 1995 S&E Ph.D. recipients reporting various support modes as any, primary or secondary support source

Support mode	1986			1995		
	Any[1] support	Primary support	Secondary support	Any[1] support	Primary support	Secondary support
Fellowship	7	3	2	7	3	2
Traineeship	30	11	9	21	8	8
Research assistantship	56	30	16	66	38	21
Teaching assistantship	52	19	21	51	18	22
Own funds	70	25	34	61	22	32
Loans	29	2	10	20	2	8
Other	26	9	8	24	9	7

[1] Students may report more than one mode of support. These columns present data on support reported from any of these modes.

NOTE: Primary and secondary columns may not total 100 percent due to rounding.
Percentages are based on actual responses. The nonresponse rate was 4 percent for any support, 24 percent for primary support, and 37 percent for secondary support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Table 3. Percentages of 1995 S&E Ph.D. recipients using various numbers of support modes, by field

Field	Number of support modes					
	1	2	3	4	5	More than 5
Total S&E	16	42	24	13	4	1
Agricultural sciences	27	45	19	6	2	1
Biological sciences	19	42	24	12	3	0
Health sciences	18	38	25	14	4	1
Engineering	19	47	22	9	2	1
Computer & information sciences	13	46	27	11	2	1
Mathematics	17	45	24	11	2	1
Physical sciences	12	47	26	11	3	1
Earth, atmospheric, & ocean sciences	15	39	26	14	5	1
Psychology	12	32	28	19	8	1
Social sciences	12	34	24	18	8	4

NOTE: Rows may not total 100 percent due to rounding. 1,779 Ph.D.s did not report any mode of support. Percentages are based on those reporting at least one mode of support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Table 4. Average number of modes of support used by 1995 S&E Ph.D. recipients, by field

Field	Average number of modes used
Total S&E	2.5
Agricultural sciences	2.1
Biological sciences	2.4
Health sciences	2.5
Engineering	2.3
Computer & information sciences	2.4
Mathematics	2.4
Physical sciences	2.5
Earth, atmospheric, & ocean sciences	2.6
Psychology	2.8
Social sciences	2.9

NOTE: 1,779 Ph.D.s did not report any mode of support. Averages are based on those reporting at least one mode of support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Table 5. Any, primary, and secondary modes of support for 1995 S&E Ph.D. recipients, by field (percentages)

Field	Fellowship	Traineeship	Research assistant-ship	Teaching assistant-ship	Own funds	Loans	Other
Any mode							
Total S&E	7	21	66	51	61	20	24
Agricultural sciences	6	9	74	19	58	16	32
Biological sciences	8	34	67	41	53	19	19
Health sciences	5	28	47	33	82	22	34
Engineering	5	12	79	41	56	9	25
Computer & information sciences	7	14	71	56	62	9	26
Mathematics	6	20	47	85	49	11	20
Physical sciences	6	15	86	73	41	13	15
Earth, atmospheric, & ocean sciences	8	15	81	49	59	16	30
Psychology	3	20	46	50	86	51	26
Social sciences	13	30	45	63	75	28	32
Primary mode							
Total S&E	3	8	38	18	22	2	9
Agricultural sciences	4	3	52	4	17	1	19
Biological sciences	4	20	40	14	14	1	7
Health sciences	1	10	17	9	49	2	11
Engineering	3	3	56	10	15	0	13
Computer & information sciences	3	4	40	19	24	0	10
Mathematics	3	4	14	60	11	0	7
Physical sciences	3	4	57	22	8	0	6
Earth, atmospheric, & ocean sciences	2	4	52	13	18	0	11
Psychology	2	7	16	15	44	10	6
Social sciences	4	11	14	27	32	2	9
Secondary mode							
Total S&E	2	8	21	22	32	8	7
Agricultural sciences	2	5	20	10	47	8	9
Biological sciences	2	12	23	18	30	8	7
Health sciences	1	11	16	10	43	8	11
Engineering	2	6	23	23	34	4	9
Computer & information sciences	2	5	26	24	31	3	8
Mathematics	1	9	28	22	28	4	8
Physical sciences	1	5	28	40	18	3	5
Earth, atmospheric, & ocean sciences	2	7	26	25	26	5	10
Psychology	0	6	11	15	40	22	5
Social sciences	4	10	15	20	34	9	9

NOTE: Primary and secondary rows may not total 100 percent due to rounding. Percentages are based on actual responses. The nonresponse rate was 4 percent for any support, 24 percent for primary support, and 37 percent for secondary support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

ematics, psychology, and the social sciences. The use of own funds was the most frequently cited primary mode of support for those in the health sciences, psychology, and the social sciences. TAs were the most frequently cited primary mode in mathematics.

Fellowships, traineeships, and loans were the least frequently cited primary mode of support in S&E as a whole. Fellowships were the primary mode of support for only 3 percent of S&E Ph.D. recipients in 1995. Traineeships were cited as the primary mode of support more frequently in the biological sciences, health sciences, and social sciences. Loans were cited by few as a primary mode in every field except psychology. Table A1 in appendix A shows the number of doctorate recipients by primary mode of support and selected demographic and institutional characteristics.

Secondary Mode of Support

The use of own funds was the most frequently reported secondary funding mode, cited by 32 percent of respondents citing a secondary mode (table 5). By major field of study, own funds was cited as secondary support by between 18 percent (physical sciences) and 47 percent (agricultural sciences) of 1995 Ph.D.s. Use of TAs was reported by 10 to 40 percent, and RAs by 11 to 28 percent.

The following sections examine how the number of modes used varies by the respondent's sex, race/ethnicity, and citizenship. The final section considers whether those who attended public institutions reported using different numbers of funding modes than those in private institutions and whether those attending Research I institutions differed from those in all other institutions.

Number of Support Modes by Sex

Since differences between the sexes in the number of funding modes reported exist across almost all major fields of study, other characteristics besides field differences may need to be taken into account when formulating policies for graduate support (table 6). In every field except psychology, a larger percentage of women than men reported using more than three funding modes.

In mathematics, 19 percent of men reported using only one funding mode, while only 13 percent of women used a single mode of support. However, 88 percent of men in mathematics used one, two, or three modes of funding; so did 86 percent of women. The largest differences in men and women reporting one to three funding modes are in the earth, atmospheric, and ocean sciences (82 percent of men and 74 percent of women) and social sciences (74 percent of men and 65 percent of women).

Table 6. Percentages of 1995 S&E Ph.D. recipients citing 1, 2, 3, and more than 3 support modes, by sex and field

Field	1 mode		2 modes		3 modes		> 3 modes	
	F	M	F	M	F	M	F	M
Total S&E	14	17	38	44	25	24	23	15
Agricultural sciences	23	28	43	46	25	18	10	8
Biological sciences	19	19	40	43	24	24	18	15
Health sciences	17	21	38	37	25	26	20	16
Engineering	18	19	42	48	24	22	16	10
Computer & information sciences	11	13	45	47	27	27	18	13
Mathematics	13	19	47	45	26	24	14	13
Physical sciences	10	12	44	48	28	26	18	14
Earth, atmospheric, & ocean sciences	15	15	29	42	30	25	26	18
Psychology	12	11	33	32	28	28	27	29
Social sciences	10	14	32	35	23	25	35	27

NOTE: 1,779 Ph.D.s did not report any mode of support. Percentages are based on those reporting at least one mode of support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Number of Support Modes by Race/Ethnicity and Citizenship

Race/ethnicity and citizenship are aggregated into the following categories for this report:

- U.S. citizens and permanent residents, who are further subdivided as:
  - Asian (Asian or Pacific Islander);
  - underrepresented minority (black, non-Hispanic; Hispanic; and American Indian or Alaskan Native); or
  - white, non-Hispanic; and
- foreign students (persons on temporary visas).

The number of support modes reported varied with the race/ethnicity and citizenship status of respondents. Asians as well as foreign students reported considerably fewer modes of support, on average, than did other groups.[15] The average number of support modes reported by Asians and foreign students, as well as the percentage of these groups reporting more than three support modes, was lower in S&E as a whole as well as in every major field except psychology. In psychology, Asian's support patterns were similar to those of whites and underrepresented minorities in terms of both mean number of support modes and percentage reporting more than three modes (table 7).[16]

Number of Support Modes by Control and Research Emphasis of Institutions

This section examines differences in support patterns between 1995 S&E Ph.D.s who had graduated from public institutions and those from private ones, and between those from Carnegie Research I and other types of academic institutions.

Ph.D. recipients from public institutions on average used about as many support modes as those from private ones. For example, 57 percent of S&E Ph.D.s in public institutions and 58 percent of those in private institutions used one or two modes of support. There were some variations by academic discipline, most notably in psychology (table 8).

The number of funding modes varied for different types of institutions. Students who graduated from Research I institutions—the Nation's largest research performing universities—generally reported using more support modes than those attending other universities (table 9). Fifteen percent of new Ph.D.s in Research I institutions had used only one support mode. By field, proportions ranged from 9 percent in psychology to 26 percent in the agricultural sciences. In comparison, about 20 percent of Ph.D.s from the other institutions had used a single support mode, with a range from 13 percent in the earth, atmospheric, and ocean sciences to 31 percent in the agricultural sciences. In every field displayed in table 9, except the earth, atmospheric, and ocean sciences, the percentage of students using only one mode is smaller in Research I than other institutions. The percentage of students using one or two modes is also smaller in Research I universities for all fields, and the percentage using one, two or three modes is smaller for all except the earth, atmospheric, and ocean sciences and mathematics.

[15] See "Asian S&E Ph.D. Recipients—U.S. Citizens Compared to Permanent Residents" on page 23 for a cautionary note on how one should interpret the comparisons across race/ethnicity and citizenship classifications.

[16] This may be explained by the fact that a higher percentage of Asians earning psychology doctorates than of those earning doctorates in many other S&E fields were born in the United States.

Table 7. Mean number of support modes and percentages of 1995 S&E Ph.D. recipients citing various numbers of support modes, by field, race/ethnicity, and citizenship

Race/ethnicity, citizenship and number of modes	Total	Agricultural sciences	Biological sciences	Health sciences	Engineering	Computer & information sciences	Mathematics	Physical sciences	Earth, atmospheric, & ocean sciences	Psychology	Social sciences
	Mean number of support modes [1]										
Total	2.5	2.1	2.4	2.5	2.3	2.4	2.4	2.5	2.6	2.8	2.9
Asian/Pacific Islander [3]	2.1	1.6	2.0	2.0	2.1	2.3	2.0	2.2	1.9	2.8	2.2
Underrepresented minority [3, 4]	2.8	2.3	2.6	2.7	2.7	3.1	2.9	2.8	2.6	2.8	3.1
White [3]	2.7	2.5	2.6	2.6	2.5	2.6	2.7	2.7	2.9	2.9	3.1
Foreign [2]	2.1	1.8	2.0	2.2	2.1	2.3	2.1	2.1	2.2	2.4	2.3
	Percentages citing number of modes										
Asian/Pacific Islander [3]											
1	25	51	34	36	25	17	29	17	40	13	11
2	46	36	41	39	47	47	50	56	41	30	42
3	20	12	17	17	20	28	15	21	14	34	25
4	7	0	6	6	7	7	5	6	5	13	13
5	2	0	1	1	1	1	1	1	1	10	6
Underrepresented minority [3, 4]											
1	10	16	10	13	11	6	13	4	6	11	8
2	38	46	42	41	38	24	35	40	50	37	33
3	26	30	26	19	30	41	22	32	25	25	22
4	17	5	17	19	16	18	13	17	13	16	19
5	7	3	3	6	6	6	13	7	6	9	11
White [3]											
1	11	13	11	15	14	12	9	7	7	12	10
2	37	44	40	36	42	41	41	41	37	31	28
3	27	27	27	27	26	28	30	30	30	28	24
4	17	10	16	16	14	15	15	16	19	20	22
5	6	5	5	5	5	3	4	5	7	8	12
Foreign [2]											
1	22	38	30	25	22	13	22	17	23	12	19
2	50	48	47	42	53	54	50	55	44	47	43
3	21	11	17	24	20	25	21	23	26	31	25
4	6	2	5	7	4	7	7	4	5	8	11
5	1	0	1	1	0	1	0	0	2	2	2

[1] Means calculated on the basis of all funding modes, not just 5.

[2] Foreign students who were on temporary visas at the time of Ph.D. conferral.

[3] U.S. citizens and permanent residents only.

[4] Underrepresented minorities include blacks, Hispanics, and American Indians/Alaskan Natives.

NOTE: Columns may not total 100 percent due to rounding and/or to the exclusion of more than five funding modes. 1,779 Ph.D.s did not report any mode of support. Means and percentages are based on those reporting at least one mode of support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Table 8. Percentages of 1995 S&E Ph.D. recipients using various numbers of support modes, by institutional control and field

Institutional control and field	Number of support modes				
	1	2	3	4	5
Public institutions					
Total S&E	16	41	24	13	4
Agricultural sciences	27	45	19	6	3
Biological sciences	18	41	24	13	4
Health sciences	18	36	26	15	4
Engineering	19	47	22	9	2
Computer & information sciences	12	46	27	12	2
Mathematics	18	45	23	11	3
Physical sciences	11	46	26	12	3
Earth, atmospheric, & ocean sciences	16	38	27	13	5
Psychology	9	31	29	21	9
Social sciences	14	35	23	18	8
Private institutions					
Total S&E	16	42	24	12	4
Agricultural sciences	25	45	20	9	0
Biological sciences	22	43	22	11	2
Health sciences	20	42	21	10	5
Engineering	19	48	22	9	2
Computer & information sciences	14	47	28	10	2
Mathematics	14	47	28	9	2
Physical sciences	12	50	26	9	2
Earth, atmospheric, & ocean sciences	13	43	24	15	3
Psychology	17	35	26	15	6
Social sciences	10	32	26	19	10

NOTE: Rows may not total 100 percent due to rounding and/or to the exclusion of more than five funding modes. 1,779 Ph.D.s did not report any mode of support. Percentages are based on those reporting at least one mode of support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Table 9. Percentages of 1995 S&E Ph.D. recipients using various numbers of support modes, by Carnegie classification

Field	Number of support modes				
	1	2	3	4	5
Research I					
Total S&E	15	42	25	13	4
Agricultural sciences	26	45	20	6	3
Biological sciences	17	41	25	13	4
Health sciences	16	38	25	15	5
Engineering	18	47	23	9	2
Computer & information sciences	10	45	29	13	3
Mathematics	16	47	24	10	2
Physical sciences	11	48	27	11	3
Earth, atmospheric, & ocean sciences	16	38	27	13	5
Psychology	9	33	27	21	9
Social sciences	11	33	24	19	9
Other than Research I					
Total S&E	20	41	24	11	4
Agricultural sciences	31	44	18	6	1
Biological sciences	24	42	21	10	2
Health sciences	26	38	25	9	2
Engineering	22	48	21	6	2
Computer & information sciences	20	47	23	8	2
Mathematics	22	42	23	11	2
Physical sciences	15	46	26	10	3
Earth, atmospheric, & ocean sciences	13	42	25	16	4
Psychology	15	32	28	17	7
Social sciences	18	37	24	13	6

NOTE: Rows may not total 100 percent due to rounding and/or to the exclusion of more than five funding modes. A total of 1,779 Ph.D.s did not report any mode of support. Percentages are based on those reporting at least one mode of support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

PREVALENCE AND COMBINATIONS OF SUPPORT MODES

This chapter focuses on the prevalence of support modes and combinations of support modes for the 1995 cohort of S&E Ph.D. recipients. It examines how these combinations vary with the field of study, sex, race/ethnicity, citizenship, and the control and research emphasis of the degree-granting institution. If differences do exist, any policy with respect to graduate support will probably need to take into account these differences in order to accomplish its objectives. Further work may also be needed to determine the reasons for these differences. The chapter also presents the percentage of 1995 S&E Ph.D. recipients reporting each of the seven support modes as one of their modes of support, and as their primary mode of support.

As table 2 (on page 6) indicates, a substantial majority of all 1995 S&E Ph.D. recipients cited RAs and their own funds as modes of support. TAs were reported by about half of all S&E Ph.D. recipients in 1995, and each of the remaining modes of support was noted by less than one-quarter of respondents.

Few S&E doctorate recipients used only one mode of support to fund their graduate education. Five combinations of support modes, out of a possible 127, were reported by just under 40 percent of all new science and engineering Ph.D.s in 1995. About 2,700 new Ph.D.s reported using the RA + TA combination[17]. About 2,500 used the RA + own funds combination. Together, these two combinations accounted for about 20 percent of all responses. They were followed by the RA + TA + own funds combination and RA support by itself. TA + own funds was the fifth most frequently cited support mode (figure 1).

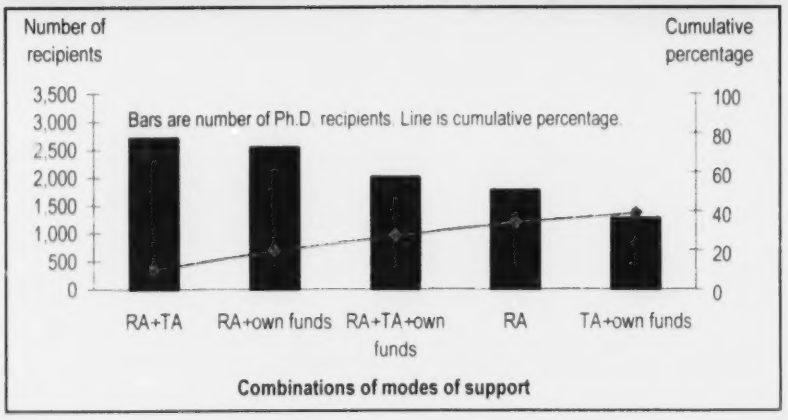
Guide to Interpreting the Figures

All figures report on the top five combinations of support modes reported by a group. The figures presented in this report plot data on two axes.

The number of doctorates reporting these top five combinations (shown in the bars) is plotted on the left axis. Because the top five combinations differ depending on the group examined, and because the total number of recipients differs by group, the scales for the left axes vary. The bars show which are the top five combinations for a given group and the frequency of use of those combinations. Comparisons between groups (or between figures) can be made concerning which combinations are the top five combinations, not concerning the number of doctorates using particular combinations.

The cumulative percentage of doctorates reporting these combinations corresponds to the right axis and is plotted as a line. Comparisons between groups (or between figures) can be made concerning the percentage of doctorates using the top five combinations of support modes.

Figure 1. Top five combinations of modes of support reported by 1995 S&E Ph.D. recipients



NOTE: RA=research assistantship; TA=teaching assistantship.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

[17]Order does not imply anything in combinations of support modes.

The following sections examine how use of the various support modes differs by demographic and institutional characteristics.

Sex, Race/Ethnicity, and Citizenship

Sex

Any and Primary Support

Among 1995 S&E doctorates, women were more likely than men to have used traineeships, their own funds, or loans. Men were more likely than women to have reported support in the form of RAs. Women and men cited fellowships, TAs, and "other" modes for their support in graduate school to similar degrees (table 10). Most—though not all—of these apparent differences in use of students' own funds and RAs are related to differences in field of doctorate. Women were more likely than men to have earned doctorates in psychology or the health sciences—fields in which use of one's own funds is common. Men were more likely to earn Ph.D.s in engineering and the physical sciences—fields in which use of RAs is common. Within most fields, differences between women and men in primary mode of support were not great. For example, own funds in psychology was cited as primary by 45 percent of women and 42 percent of men. In engineering, 58 percent of women and 55 percent of men reported RAs as their primary mode of support. In the physical sciences, 55 percent of women and 57 percent of men reported RAs as their primary mode of support (table 10).

However, differences in primary support between women and men remain large in the health sciences and computer and information sciences. Women were far more likely than men to use their own funds (58 percent versus 33 percent in the health sciences, and 35 percent versus 22 percent in the computer and information sciences). They were also far less likely than men to use RAs (12 percent versus 26 percent in the health sciences and 30 percent versus 42 percent in the computer and information sciences).

Combinations of Support Modes

The combinations of various support modes also differ by sex and by field. While the three most prevalent combinations of support for women and men are identical, for women own funds and RA were the fourth and fifth most frequently reported modes; for men, RA and TA + own funds were the fourth and fifth most frequently reported modes. The top five support modes for women accounted for 31 percent of respondents; the men's top five accounted for 44 percent of them (figures 2 and 3).

These patterns are influenced by the differential distribution by sex across the various S&E fields of study.[18] For example, in psychology, the field in which 26 percent of women (and 7 percent of men) receiving S&E doctorate degrees received their degree in 1995, own funds and own funds + loan were the two top support combinations for both women and men (table 11). These differences in field distribution most likely explain why own funds is the fourth most frequently reported combination for women.

However, the distribution across fields by sex does not entirely explain the overall results since combinations of support modes do differ by sex within some fields as well. In the health sciences, a field predominated by women, 12 percent of women and 6 percent of men reported using their own funds as their sole mode of support. In mathematics, women and men have the same top four combinations of support—RA + TA, TA + own funds, RA + TA + own funds, and TA alone. The predominant combination for men was RA + TA; the predominant combination for women was TA + own funds. Similarly, in the earth, atmospheric and ocean sciences, women and men shared the same top four combinations, but the predominant combination for women was RA + TA + own funds and the predominant combination for men was RA + own funds.

In other fields—e.g., the social sciences, computer and information sciences, physical sciences, biological sciences, and engineering—the combinations of support modes were similar for women and men. In the social sciences, the top five combinations for men and women were identical. In engineering, the physical sciences, and the biological sciences, RA, RA + TA, RA + own funds, and RA + TA + own funds were prevalent combinations for both women and men.

Race/Ethnicity and Citizenship Status

This section examines the variations in support modes by the new S&E Ph.D.s race/ethnicity and citizenship. The race/ethnicity and citizenship groups are divided into three discrete race/ethnicity categories for U.S. citizens and permanent residents only plus one foreign category, as follows:

[18] See NSF 1996c for tables showing the 1995 distribution of field by sex.

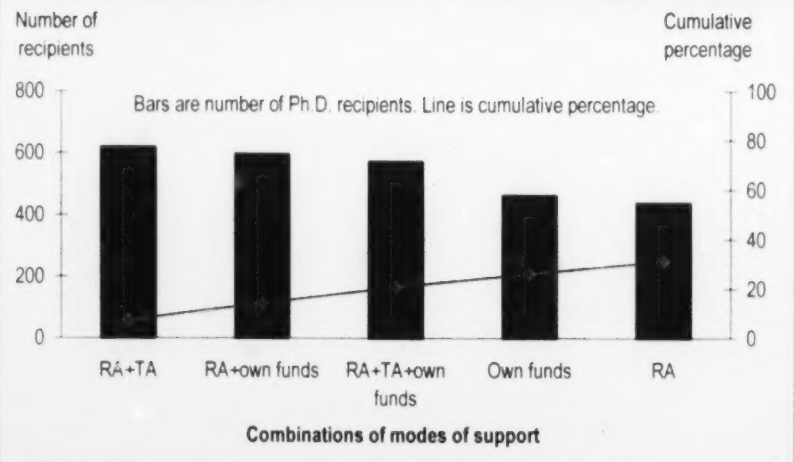
Table 10. Percentages of 1995 S&E Ph.D. recipients citing any and primary support mode, by major field of study, support mode, and sex

Field	Support mode	Percentage any support		Percentage primary support	
		Female	Male	Female	Male
Total S&E	Fellowship	9	6	4	3
	Traineeship	26	19	11	7
	Research assistantship	60	69	30	42
	Teaching assistantship	51	51	16	18
	Own funds	68	58	28	18
	Loans	27	17	4	1
	Other	26	23	8	10
Agricultural sciences	Fellowship	7	5	5	3
	Traineeship	12	8	2	3
	Research assistantship	75	73	49	53
	Teaching assistantship	22	18	7	3
	Own funds	61	57	17	17
	Loans	16	16	2	1
	Other	33	32	18	19
Biological sciences	Fellowship	8	7	4	4
	Traineeship	36	33	21	19
	Research assistantship	68	67	41	40
	Teaching assistantship	42	41	13	14
	Own funds	53	53	14	14
	Loans	19	18	1	1
	Other	20	19	6	8
Health sciences	Fellowship	5	5	1	2
	Traineeship	32	20	11	9
	Research assistantship	43	53	12	26
	Teaching assistantship	29	40	5	17
	Own funds	87	72	58	33
	Loans	23	21	2	3
	Other	36	31	10	12
Engineering	Fellowship	15	4	8	2
	Traineeship	18	11	6	3
	Research assistantship	82	78	58	55
	Teaching assistantship	43	41	7	10
	Own funds	51	57	10	16
	Loans	10	9	0	1
	Other	25	24	11	13
Computer & information sciences	Fellowship	11	6	5	3
	Traineeship	19	13	6	3
	Research assistantship	69	71	30	42
	Teaching assistantship	55	56	16	20
	Own funds	66	61	35	22
	Loans	9	9	1	0
	Other	29	25	8	10
Mathematics	Fellowship	7	5	3	3
	Traineeship	20	20	4	4
	Research assistantship	45	48	12	15
	Teaching assistantship	89	84	62	60
	Own funds	56	46	13	10
	Loans	10	11	0	0
	Other	19	20	6	8
Physical sciences	Fellowship	7	5	3	3
	Traineeship	16	14	6	3
	Research assistantship	86	86	55	57
	Teaching assistantship	75	72	23	22
	Own funds	41	41	8	8
	Loans	15	12	0	0
	Other	19	14	6	6
Earth, atmospheric & ocean sciences	Fellowship	15	5	5	2
	Traineeship	16	15	4	4
	Research assistantship	85	81	54	51
	Teaching assistantship	54	47	12	13
	Own funds	57	59	14	19
	Loans	20	15	0	0
	Other	31	29	12	11
Psychology	Fellowship	4	3	2	2
	Traineeship	20	20	7	7
	Research assistantship	45	48	15	17
	Teaching assistantship	49	52	13	17
	Own funds	87	84	45	42
	Loans	50	52	11	9
	Other	26	25	7	6
Social sciences	Fellowship	17	11	5	3
	Traineeship	33	29	12	11
	Research assistantship	49	43	14	14
	Teaching assistantship	64	62	25	28
	Own funds	78	73	34	31
	Loans	32	26	3	2
	Other	32	31	7	10

NOTE: Primary support columns may not total 100 percent due to rounding. 6,621 Ph.D.s did not report a primary mode of support and, of these, 1,779 did not report any mode of support. Percentages are based on actual responses. The nonresponse rate was 4 percent for any support and 24 percent for primary support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

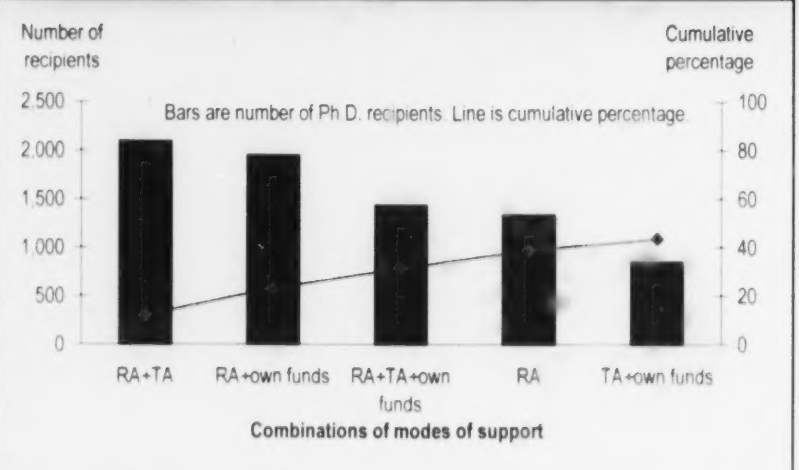
Figure 2. Top five combinations of modes of support reported by female 1995 S&E Ph.D. recipients



NOTE: RA=research assistantship; TA=teaching assistantship.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Figure 3. Top five combinations of modes of support reported by male 1995 S&E Ph.D. recipients



NOTE: RA=research assistantship; TA=teaching assistantship.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Table 11. Percentages of 1995 S&E Ph.D. recipients, by selected combinations of support modes, sex, and field

Field	Sex	Own funds	Own funds + Other	Traineeship + Own funds	RA + Own funds	RA + TA + Own funds	TA + Own funds	Own funds + Loan	Other	RA + TA + Own funds + Other	RA + Own funds + Loan	RA	TA + Own funds + Loan	RA + TA	RA + TA + Own funds + Loan	Traineeship + RA	RA + Other	Traineeship + TA	TA	Traineeship + RA + TA + Own funds	RA + Own funds + Other	Traineeship + RA + TA
Agricultural sciences	F	3	3	0	23	4	1	0	6	2	6	11	0	3	1	1	5	0	0	1	5	1
	M	3	5	1	22	3	1	1	8	1	4	15	1	4	2	1	6	0	0	1	5	0
Biological sciences	F	2	2	4	9	6	3	0	1	2	2	10	1	7	2	4	2	1	1	3	1	2
	M	2	3	4	10	6	3	1	2	1	2	9	1	8	2	4	2	1	2	2	2	3
Health sciences	F	12	11	8	7	4	3	3	3	2	2	2	2	1	1	1	1	0	0	3	3	0
	M	6	6	2	10	6	5	3	4	2	1	8	3	4	2	1	2	1	1	2	3	1
Engineering	F	1	2	0	14	6	2	0	2	2	1	12	0	12	2	3	3	0	1	2	3	1
	M	3	5	1	18	10	3	0	4	2	2	11	0	12	2	2	4	0	1	2	3	2
Computer/information sciences	F	4	5	2	7	11	7	1	1	5	0	6	1	13	1	2	3	1	1	3	3	0
	M	5	5	0	12	12	6	0	2	3	2	4	1	14	2	2	3	0	2	3	2	2
Mathematics	F	2	2	0	2	9	20	0	0	2	0	2	2	14	2	1	0	4	9	2	0	3
	M	1	2	1	2	8	13	0	2	1	0	1	2	16	2	1	1	3	13	3	0	4
Physical sciences	F	0	1	0	6	11	2	0	1	3	0	7	1	26	3	2	2	1	2	3	1	3
	M	1	1	0	8	12	3	0	1	2	1	8	0	29	3	1	1	1	2	3	1	4
Earth, atmospheric & ocean sciences	F	3	1	2	6	11	1	0	1	4	4	10	0	9	4	2	5	0	1	2	3	1
	M	2	4	1	14	9	3	1	3	4	2	10	1	11	2	2	3	0	0	2	3	2
Psychology	F	10	4	2	4	6	6	10	1	1	3	0	5	2	6	0	0	0	0	2	1	0
	M	8	3	2	4	5	5	9	1	1	5	1	6	3	8	1	1	1	0	3	1	1
Social sciences	F	6	5	2	4	5	9	1	1	2	1	1	2	3	3	1	1	2	1	3	1	1
	M	6	5	2	5	5	10	1	3	2	1	2	3	3	3	1	1	2	2	4	1	1

NOTE: Rows do not add to 100 percent because only selected combinations of support modes are shown. 1,779 Ph.D.s did not report any mode of support. Percentages are based on those reporting at least one mode of support. Combinations selected are those which include the top five combinations for any field. No combinations representing 5 percent or more of respondents were excluded from this table.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

- U.S. citizens and permanent residents:
  - white, non-Hispanic;
  - Asian (Asian or Pacific Islander); or
  - underrepresented minority (black, non-Hispanic; Hispanic; and American Indian or Alaskan Native);
- foreign students (persons on temporary visas).

Patterns of support for S&E doctorate recipients by race/ethnicity reflect differences in eligibility for various support modes. Support patterns in S&E for Asians[19] and foreign students on temporary visas are similar and patterns for whites and underrepresented minorities are similar. Asians and foreign students on temporary visas are similar because a large proportion of the Asian group, especially Chinese students, are permanent residents who may have entered graduate school on temporary visas.

Any Support

Higher percentages of Asians and foreign students reported use of RAs as *one* of their modes of support than other groups of Ph.D. recipients. Nearly 8 of 10 Ph.D. recipients of Asian background reported having some RA support (table 12). Similarly, 71 percent of foreign students received RAs. Asians and foreign students were less likely than other students to report use of own funds, loans, fellowships, and traineeships. Foreign students differed from Asians in that a higher percentage of foreign students than of Asians reported use of own funds and "other" support (which includes support from foreign governments) and foreign students were the least likely of any group to use loans.[20]

The support mode identified as one of the modes of support by the largest percentage of both underrepresented minorities and whites was their own funds, 67 and 72 percent, respectively. Although RAs were the second largest support mode reported by both of these two groups, substantially smaller proportions of whites or underrepresented minorities reported having RAs than did either Asians or foreign students. Whites and underrepresented minorities were also much more likely to report the use of loans than were Asians or foreign students. Underrepresented minorities were most likely of any racial/ethnic group to report the use of both fellowships and traineeships.

The overall patterns of support for the various racial/ethnic groups are also generally reflected in individual S&E fields. In all S&E fields, use of some loan funds is far more prevalent among both whites and underrepresented minorities than among Asians or foreign students. Also, in all S&E fields use of loans is more prevalent among underrepresented minorities than it is among whites (although some differences are small).[21] The use of loans was least likely to be reported by foreign students in every field except the agricultural and earth, atmospheric, and ocean sciences.

In every field except the agricultural sciences, biological sciences, and mathematics, underrepresented minorities reported less use of RAs than the other three groups. In contrast, a higher percentage of underrepresented minorities reported using fellowships and traineeships than any other group in almost every major field of study. (The exception was fellowships in the earth, atmospheric, and ocean sciences, where whites reported the greatest use.) Asians reported the greatest use of RAs in every field except for the computer and information sciences and psychology; in these fields, foreign students had higher RA usage than Asians.

Primary Support[22]

Use of various *primary* support modes follows the same patterns noted above for *any* use of the various support modes. Over half of Asian S&E doctorate recipients, and nearly half of foreign students, reported RAs as their primary mode of support; this compares with fewer than one-third of whites and about one-fifth of underrepresented minorities. In contrast, whites and underrepresented minorities were more than twice as likely to report that own funds were their primary mode of support as were Asians or foreign students. Table 12 details the primary mode of support reported by these race/ethnicity and citizenship groups. RAs are the most frequently cited primary mode for each group except for underrepresented minorities: they most frequently cited use of their own funds.

[19]See "Asian S&E Ph.D. Recipients—U.S. Citizens Compared to Permanent Residents" on page 23 for a cautionary note on how one should interpret the comparisons across race/ethnicity and citizenship classifications.

[20]Most foreign students on temporary visas are not eligible for many Federal loan programs.

[21]For information about indebtedness at the time of receipt of the doctorate by race/ethnicity, see NSF 1999b.

[22]Because nonresponse to primary source of support was high and varied somewhat between groups (see table A2), the reader is cautioned that some of the differences between groups in primary support may be due to differences in nonresponse.

Table 12. Percentages of 1995 S&E Ph.D. recipients citing any and primary support mode, by major field of study, support mode, citizenship, and racial/ethnic background of U.S. citizens and permanent residents

Field	Support mode	Percentage any support				Percentage primary support			
		Asian/ Pacific Islander [1]	Under-represented minority [1,2]	White [1]	Foreign on temporary visa [3]	Asian/ Pacific Islander [1]	Under-represented minority [1,2]	White [1]	Foreign on temporary visa [3]
Total S&E	Fellowship	5	16	8	4	2	11	4	1
	Traineeship	18	35	25	13	8	18	9	5
	Research assistantship	79	50	61	71	55	21	31	47
	Teaching assistantship	54	44	52	50	21	12	16	21
	Own funds	40	67	72	49	10	24	29	11
	Loans	7	40	31	1	1	6	3	0
	Other	13	26	26	25	4	9	8	15
Agricultural sciences	Fellowship	5	11	5	6	3	15	2	5
	Traineeship	3	14	13	5	0	12	4	1
	Research assistantship	91	70	76	68	84	35	54	45
	Teaching assistantship	12	30	26	12	2	8	6	2
	Own funds	30	51	77	43	6	19	26	8
	Loans	1	30	29	2	0	0	1	1
	Other	19	27	25	43	5	12	7	39
Biological sciences	Fellowship	6	18	9	4	3	12	4	2
	Traineeship	31	44	39	20	21	19	22	13
	Research assistantship	76	65	64	68	54	38	35	47
	Teaching assistantship	39	37	43	39	12	10	13	17
	Own funds	32	52	63	42	6	12	19	6
	Loans	6	30	27	1	0	2	1	0
	Other	10	17	21	25	3	7	6	15
Health sciences	Fellowship	1	9	5	4	0	7	1	2
	Traineeship	19	37	31	16	10	18	10	8
	Research assistantship	68	35	43	58	46	11	13	24
	Teaching assistantship	28	33	34	33	8	8	8	16
	Own funds	56	86	89	63	25	42	58	26
	Loans	10	38	27	3	4	4	2	1
	Other	17	31	35	41	6	8	8	24
Engineering	Fellowship	4	18	9	2	2	14	5	1
	Traineeship	10	30	17	7	2	13	4	1
	Research assistantship	87	64	71	82	68	27	46	62
	Teaching assistantship	45	34	39	43	11	5	7	12
	Own funds	46	64	66	52	12	21	20	12
	Loans	5	23	19	1	0	0	1	0
	Other	14	36	33	21	5	20	16	12
Computer & information sciences	Fellowship	5	41	9	3	2	29	4	1
	Traineeship	15	24	17	10	0	7	5	3
	Research assistantship	69	47	66	79	48	0	31	50
	Teaching assistantship	57	47	49	66	20	7	14	27
	Own funds	57	71	74	49	23	21	35	10
	Loans	7	35	14	2	0	14	0	0
	Other	19	47	30	22	8	21	11	10

See NOTE and SOURCE at end of table.

Table 12. Percentages of 1995 S&E Ph.D. recipients citing any and primary support mode, by major field of study, support mode, citizenship, and racial/ethnic background of U.S. citizens and permanent residents

Field	Support mode	Percentage any support				Percentage primary support			
		Asian/ Pacific Islander [1]	Under-represented minority [1, 2]	White [1]	Foreign on temporary visa [3]	Asian/ Pacific Islander [1]	Under-represented minority [1, 2]	White [1]	Foreign on temporary visa [3]
Mathematics	Fellowship	2	18	8	3	1	11	5	0
	Traineeship	14	41	22	19	2	11	4	6
	Research assistantship	52	45	45	47	14	17	13	16
	Teaching assistantship	91	73	85	83	78	39	54	63
	Own funds	28	59	62	40	4	22	17	4
	Loans	2	23	20	1	0	0	0	0
	Other	8	32	24	20	2	0	7	12
Physical sciences	Fellowship	2	18	8	2	1	12	4	0
	Traineeship	13	28	17	10	3	13	4	2
	Research assistantship	91	71	85	87	65	36	53	61
	Teaching assistantship	76	69	73	70	26	22	19	27
	Own funds	25	53	50	34	4	6	11	4
	Loans	3	26	22	0	0	2	0	0
	Other	6	18	20	11	2	8	7	6
Earth, atmospheric & ocean sciences	Fellowship	4	6	9	6	0	8	4	0
	Traineeship	10	31	17	13	5	8	3	5
	Research assistantship	94	69	81	77	77	31	46	54
	Teaching assistantship	35	50	57	36	10	8	14	13
	Own funds	31	56	68	50	7	23	22	9
	Loans	2	25	23	2	0	8	0	0
	Other	11	25	31	36	1	15	11	19
Psychology	Fellowship	3	10	2	5	1	8	1	0
	Traineeship	17	33	19	18	7	22	5	10
	Research assistantship	60	35	45	62	23	9	16	26
	Teaching assistantship	54	37	51	51	27	7	14	26
	Own funds	76	79	89	71	26	32	47	26
	Loans	38	57	53	4	9	15	11	1
	Other	32	26	26	30	7	8	6	11
Social sciences	Fellowship	13	23	14	9	4	9	4	3
	Traineeship	30	38	33	22	12	20	11	10
	Research assistantship	54	39	45	44	19	5	14	17
	Teaching assistantship	71	54	64	60	39	18	25	30
	Own funds	61	74	83	63	21	32	39	22
	Loans	17	53	40	1	2	11	3	0
	Other	22	29	31	35	4	6	5	19

[1] U.S. citizens and permanent residents only.

[2] Underrepresented minorities include blacks, Hispanics, and American Indians/Alaskan Natives.

[3] Foreign students who were on temporary visas at the time of Ph.D. conferral.

NOTE: Primary support columns may not total 100 percent due to rounding. 6,621 Ph.D.s did not report a primary mode of support and, of these, 1,779 did not report any mode of support. Percentages are based on actual responses. The nonresponse rate was 4 percent for any support and 24 percent for primary support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Asian S&E Ph.D. Recipients—U.S. Citizens Compared to Permanent Residents

The analysis of 1995 data on Asian U.S. citizen and permanent resident S&E Ph.D.s is complicated by the Chinese Student Protection Act of 1992. The Act allowed Chinese students to apply for permanent residency in 1993. As a result the number of Asian U.S. citizen plus permanent resident S&E Ph.D.s in 1995 is higher than it would have been had this Act not been passed. In fact, only 24 percent of the 1995 doctoral recipients in this combined group were U.S. citizens while the remaining 76 percent were permanent residents.[23] Seventy-seven percent of those permanent residents were from the People's Republic of China.

Table 13 indicates that the primary support patterns of Asian U.S. citizen and Asian permanent resident S&E Ph.D.s differ rather substantially. A comparison of table 13 and table 12 indicates that the former group has patterns which are more like those of the white U.S. citizens plus permanent resident group, while the latter group has patterns more like the foreigners on temporary visas. Therefore, these distinctions should be kept in mind when interpreting the results of this study.

Table 13. Percentages of permanent resident and U.S. citizen Asian/Pacific Islander 1995 S&E Ph.D. recipients by primary support mode

	Percentage primary support	
Support mode	Asian/Pacific Islander permanent resident [1]	Asian/Pacific Islander U.S. citizen
Fellowship	1	5
Traineeship	6	14
Research assistantship	61	39
Teaching assistantship	23	14
Own funds	7	17
Loans	0	2
Other	2	7

[1] See box above for the influence of the Chinese Student Protection Act of 1992 on numbers of Asian/Pacific Islander permanent residents.

NOTE: The 949 U.S. citizen and permanent resident Asian or Pacific Islander Ph.D.s not reporting a primary mode of support were excluded from this table. Percentages are based on those reporting a primary mode of support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

[23] In 1992, 49 percent of this combined group were U.S. citizens.

Some of these variations in modes of support reflect field differences among groups. For example, appendix table A4 shows that most Asian students received their Ph.D.s in engineering (27 percent), the biological sciences (25 percent), or the physical sciences (20 percent). Each of these three fields showed a large percentage of students citing RAs as a primary or secondary mode of support. By comparison, 24 percent of Ph.D.s granted to underrepresented minorities were in psychology and 20 percent in the social sciences. Those two fields were among those with the smallest percentages of students reporting that RAs were either their primary or secondary mode of support.

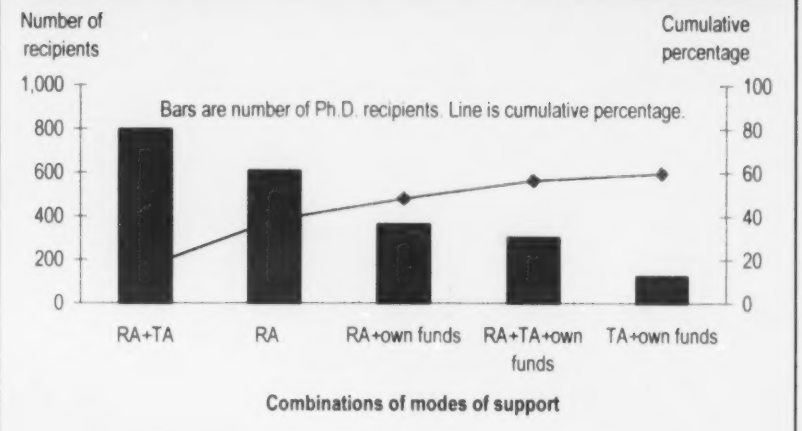
Despite differences in racial/ethnic distributions across fields, groups vary in mode of support within major fields of study (table 12). In every major field of study, a larger percentage of both underrepresented minorities and whites report using their own funds and loans as *one* of their modes of support than do Asians or foreign students. Similarly in all major fields of study, with the exception of the computer and information sciences, a larger percentage of underrepresented minorities and whites than of Asians and foreign students reported that their own funds and loans were their *primary* source of support. The differences in the percentage reporting any support from own funds and—especially—loans between the underrepresented minority and white groups on the one hand, and the Asian and foreign student groups on the other, are generally much larger than the differences in the percentages reporting own funds and loans as their *primary* mode of support.

Combinations of Support Modes

An examination of the combinations of support shows that almost 40 percent of Asians received their support from either the RA + TA combination or from RAs alone (figure 4). The top five combinations for Asians accounted for the support of about 60 percent of Asian Ph.D.s.

Each of the top five combinations of modes of support for underrepresented minorities involves using their own resources (figure 5); no other group shows such extensive reliance on own funds in their top five combinations of support. These top five support combinations provided support for 22 percent of underrepresented minority Ph.D. recipients. In fact, the top 10 combinations provided support for 37 percent, far below the numbers for other groups, which ranged from 48 to 75 percent.

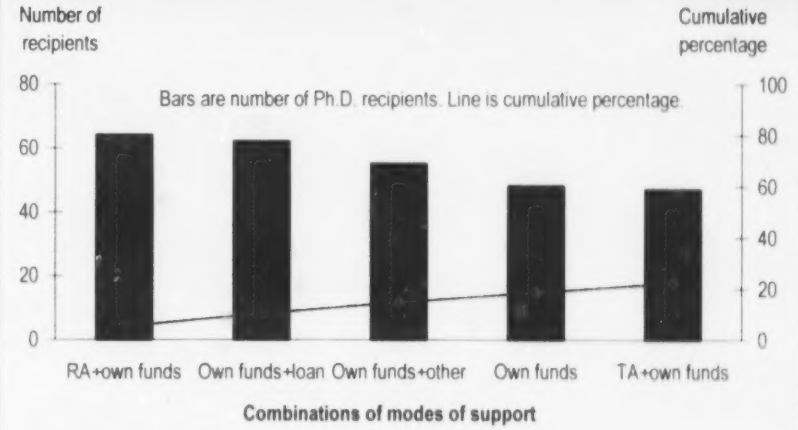
Figure 4. Top five combinations of modes of support reported by Asian/Pacific Islander 1995 S&E Ph.D. recipients



NOTES: Only U.S. citizens and permanent residents are included in this figure.
RA=research assistantship; TA=teaching assistantship.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Figure 5. Top five combinations of modes of support reported by 1995 S&E Ph.D. recipients of underrepresented minority background



NOTES: Only U.S. citizens and permanent residents are included in this figure. The underrepresented minority group includes blacks, Hispanics, and American Indians/Alaskan Natives. RA=research assistantship; TA=teaching assistantship.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

For white Ph.D. recipients (figure 6), as for underrepresented minorities, RA + own funds was the most frequently used combination. Also, like underrepresented minorities, whites relied heavily on own funds in the top five combinations of modes of support.

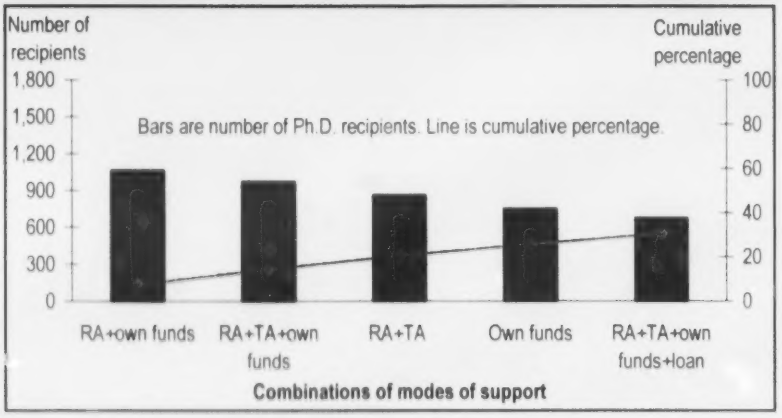
Whites are also similar to Asian and foreign students in use of RAs in four of the top five combinations and in use of TAs in three of the top five combinations. The top five combinations provided support for 30 percent of white Ph.D. recipients. The top 10 combinations provide funding for 48 percent of whites.

The RA + own funds combination provided funding for approximately 15 percent of S&E Ph.D. recipients who are not U.S. citizens, slightly more than the RA + TA combination (figure 7). The top five combinations account for the support of 57 percent of these S&E Ph.D.s.

Institutional Characteristics

This section examines how support patterns differ based on the type of institutional control—public or private, and on research emphasis as determined by Carnegie classification.

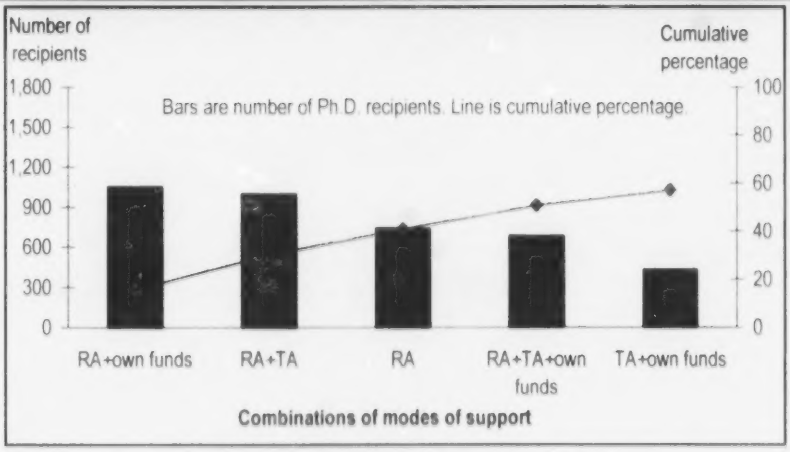
Figure 6. Top five combinations of modes of support reported by white 1995 S&E Ph.D. recipients



NOTE: Only U.S. citizens and permanent residents are included in this figure. RA=research assistantship; TA=teaching assistantship.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Figure 7. Top five combinations of modes of support reported by 1995 S&E Ph.D. recipients on temporary visas



NOTE: RA=research assistantship; TA=teaching assistantship.

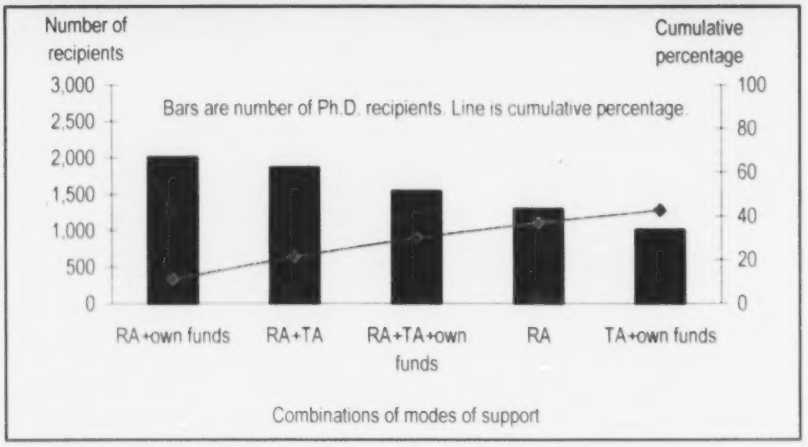
SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Institutional Control

Support patterns show little variation between publicly and privately controlled institutions. As table 14 shows, there is more similarity than difference in how students in the two types of institutions fund their graduate education. In both types of institutions, RAs are the most frequently used support mode, with students' own funds the next most frequent, followed by TAs.

In both types of institutions, over half of the new Ph.D.s reported RAs and use of their own funds among their support modes. In public institutions, half also reported TAs as a mode of support. Graduate fellowships (nationally-competitive) were infrequently reported in either type of institution, but were cited less in public than in private ones. The top four combinations are the same for both types of institutions, with only the order and level varying (figures 8 and 9). The fifth most prevalent combination in public institutions was TA + own funds; the fifth most prevalent combination in private institutions was own funds. The top five combinations in private institutions were used by 33 percent of the doctoral recipients compared with 43 percent in public institutions.

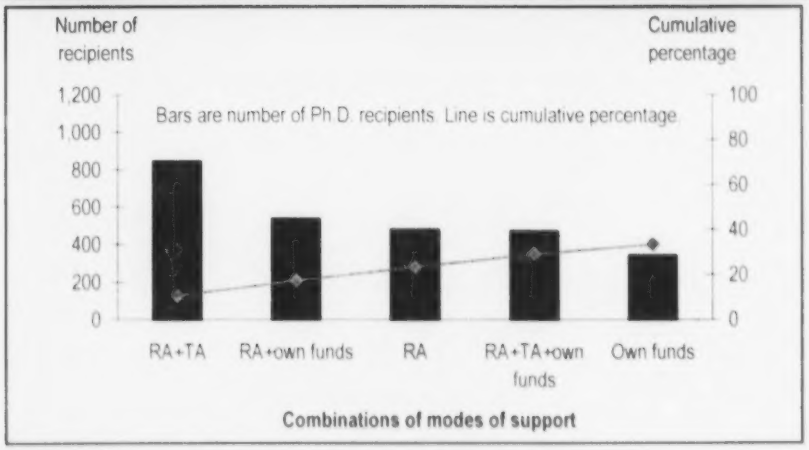
Figure 8. Top five combinations of modes of support reported by 1995 S&E Ph.D. recipients in public institutions



NOTE: RA=research assistantship; TA=teaching assistantship.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Figure 9. Top five combinations of modes of support reported by 1995 S&E Ph.D. recipients in private institutions



NOTE: RA=research assistantship; TA=teaching assistantship.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Table 14. Percentages of 1995 S&E Ph.D. recipients citing any and primary support mode, by institutional control, major field of study, and support mode

Field	Support mode	Percentage any support		Percentage primary support	
		Public	Private	Public	Private
Total S&E	Fellowship	6	10	2	5
	Traineeship	19	27	6	13
	Research assistantship	68	60	40	34
	Teaching assistantship	53	47	20	13
	Own funds	62	58	22	20
	Loans	20	21	1	3
	Other	23	26	9	10
Agricultural sciences	Fellowship	5	16	3	16
	Traineeship	8	18	3	7
	Research assistantship	74	67	53	36
	Teaching assistantship	19	25	4	7
	Own funds	59	33	17	7
	Loans	16	15	1	2
	Other	32	38	19	27
Biological sciences	Fellowship	6	10	3	6
	Traineeship	28	49	14	33
	Research assistantship	71	57	44	33
	Teaching assistantship	46	32	16	8
	Own funds	56	47	15	11
	Loans	20	15	1	1
	Other	19	19	7	9
Health sciences	Fellowship	4	7	1	1
	Traineeship	27	32	9	12
	Research assistantship	50	35	18	12
	Teaching assistantship	34	27	11	4
	Own funds	82	80	48	53
	Loans	21	24	2	5
	Other	34	37	11	11
Engineering	Fellowship	5	7	2	5
	Traineeship	11	14	3	4
	Research assistantship	79	78	56	56
	Teaching assistantship	41	42	10	9
	Own funds	59	49	18	10
	Loans	10	8	1	0
	Other	23	29	11	16
Computer & information sciences	Fellowship	6	9	2	6
	Traineeship	13	16	3	5
	Research assistantship	72	68	39	42
	Teaching assistantship	60	48	22	12
	Own funds	62	62	25	22
	Loans	8	9	0	0
	Other	25	27	9	13
Mathematics	Fellowship	4	9	2	5
	Traineeship	17	27	3	8
	Research assistantship	44	54	12	20
	Teaching assistantship	88	79	65	51
	Own funds	51	43	12	7
	Loans	11	9	0	0
	Other	20	18	7	9
Physical sciences	Fellowship	4	8	2	5
	Traineeship	14	16	3	5
	Research assistantship	86	87	55	59
	Teaching assistantship	74	69	25	17
	Own funds	44	35	9	6
	Loans	15	9	0	0
	Other	15	16	5	7
Earth, atmospheric & ocean sciences	Fellowship	7	11	2	5
	Traineeship	14	22	3	8
	Research assistantship	81	83	52	51
	Teaching assistantship	49	49	13	11
	Own funds	61	50	19	11
	Loans	16	15	0	0
	Other	30	28	10	14
Psychology	Fellowship	3	3	2	2
	Traineeship	22	16	7	7
	Research assistantship	54	32	20	9
	Teaching assistantship	59	36	19	7
	Own funds	84	90	40	52
	Loans	47	56	6	18
	Other	26	26	7	5
Social sciences	Fellowship	10	19	3	6
	Traineeship	25	40	6	20
	Research assistantship	47	41	16	12
	Teaching assistantship	65	58	31	20
	Own funds	76	74	34	30
	Loans	28	29	2	2
	Other	29	36	8	10

NOTE: Primary support columns may not total 100 percent due to rounding. A total of 6,621 Ph.D.s did not report a primary mode of support and, of these, 1,779 did not report any mode of support. Percentages are based on actual responses. The nonresponse rate was 4 percent for any support and 24 percent for primary support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Carnegie Institutional Classification

Academic institutions were divided into the largest research-performing universities (Research I institutions; see Appendix A) and all other institutions in order to examine how institutions that differ in terms of research emphasis vary in terms of modes of support used by their students.

Table 15 shows that 1995 S&E Ph.D.s from Research I institutions were less likely to report their own funds and more likely to report RAs than doctorates from other types of institutions. Fifty-eight percent of those in Research I institutions and 68 percent of those from other institutions used their own funds. Seventy percent of S&E Ph.D recipients from Research I institutions received support via an RA, while slightly more than half of those from other institutions received support in the form of an RA. These patterns hold for almost all S&E fields. Those in Research I institutions were also somewhat more likely to have held fellowships or traineeships or to have served as teaching assistants.

For doctorates from non-Research I institutions, RA + own funds was the most frequently cited mode of support, whereas the RA + TA combination was the most frequently cited one at Research I institutions (figures 10 and 11). An examination of the combinations of support used by students in the Research I institutions versus all others shows some similarities and some differences. Four of the top five combinations of modes of support—RA + TA, RA + own funds, RA + TA + own funds, and TA + own funds—are identical for both types of institutions. Own funding is important at both types of institutions but less so at Research I institutions, where it is an element of three of the five top combinations of support modes, compared with four of the top five at the other institutions. Own funds only is the third most prevalent combination of support at non-Research I institutions.

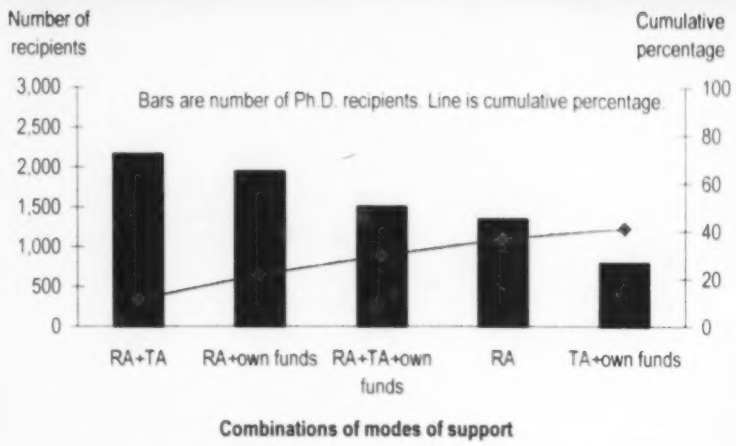
Table 15. Percentages of 1995 S&E Ph.D. recipients citing any and primary support mode, by Carnegie classification, major field of study, and support mode

Field	Support mode	Percentage any support		Percentage primary support	
		Research I	All others	Research I	All others
Total S&E	Fellowship	8	3	4	1
	Traineeship	24	16	9	6
	Research assistantship	70	54	42	28
	Teaching assistantship	53	47	17	18
	Own funds	58	68	18	32
	Loans	18	26	1	4
	Other	24	25	9	10
Agricultural sciences	Fellowship	6	5	4	3
	Traineeship	10	7	3	4
	Research assistantship	75	69	53	49
	Teaching assistantship	19	19	4	6
	Own funds	58	56	17	18
	Loans	16	15	1	2
	Other	33	30	19	18
Biological sciences	Fellowship	9	5	5	2
	Traineeship	38	25	21	16
	Research assistantship	70	59	42	35
	Teaching assistantship	42	41	12	18
	Own funds	52	57	12	20
	Loans	18	20	0	1
	Other	19	20	7	8
Health sciences	Fellowship	5	3	2	0
	Traineeship	30	21	11	7
	Research assistantship	51	36	18	14
	Teaching assistantship	35	27	10	9
	Own funds	81	84	45	60
	Loans	22	20	2	3
	Other	35	33	12	7
Engineering	Fellowship	6	3	4	1
	Traineeship	13	9	3	4
	Research assistantship	82	68	59	44
	Teaching assistantship	41	44	8	14
	Own funds	56	58	14	21
	Loans	10	9	1	0
	Other	24	27	11	17
Computer & information sciences	Fellowship	9	2	4	0
	Traineeship	15	11	4	3
	Research assistantship	81	45	48	18
	Teaching assistantship	60	48	19	20
	Own funds	58	73	18	41
	Loans	8	10	0	0
	Other	23	33	7	17
Mathematics	Fellowship	7	2	4	1
	Traineeship	20	20	4	6
	Research assistantship	53	30	16	9
	Teaching assistantship	88	78	62	57
	Own funds	44	62	9	18
	Loans	9	15	0	0
	Other	19	22	7	10
Physical sciences	Fellowship	6	3	4	1
	Traineeship	16	12	4	2
	Research assistantship	89	77	60	45
	Teaching assistantship	73	72	20	32
	Own funds	40	46	7	12
	Loans	12	16	0	0
	Other	15	15	6	7
Earth, atmospheric, & ocean sciences	Fellowship	9	5	3	1
	Traineeship	16	13	4	4
	Research assistantship	83	77	54	45
	Teaching assistantship	47	54	12	16
	Own funds	56	65	15	24
	Loans	15	17	0	1
	Other	31	27	12	9
Psychology	Fellowship	5	1	3	0
	Traineeship	27	13	10	4
	Research assistantship	55	38	21	10
	Teaching assistantship	58	43	20	9
	Own funds	81	92	34	55
	Loans	42	59	5	16
	Other	25	27	8	5
Social sciences	Fellowship	16	5	5	1
	Traineeship	33	21	13	6
	Research assistantship	47	37	15	11
	Teaching assistantship	65	52	28	22
	Own funds	74	80	29	46
	Loans	28	29	2	3
	Other	31	32	8	11

NOTE: Primary support columns may not total 100 percent due to rounding. A total of 6,621 Ph.D.s did not report a primary mode of support and, of these, 1,779 did not report any mode of support. Percentages are based on actual responses. The nonresponse rate was 4 percent for any support and 24 percent for primary support.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

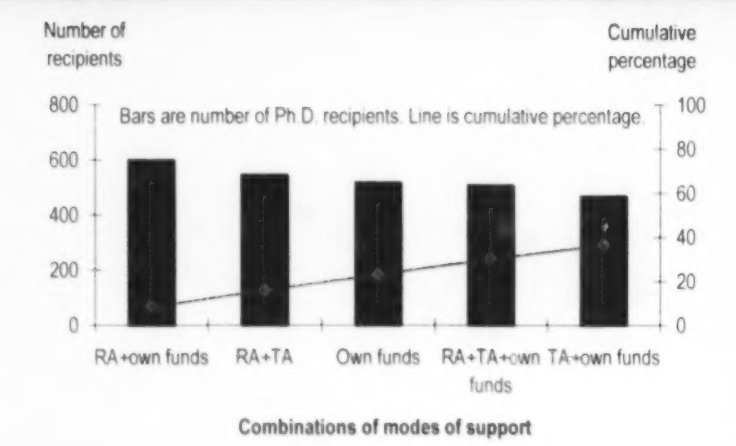
Figure 10. Top five combinations of modes of support reported by 1995 S&E Ph.D. recipients in Research I institutions



NOTE: RA=research assistantship; TA=teaching assistantship.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Figure 11. Top five combinations of modes of support reported by 1995 S&E Ph.D. recipients in institutions other than Research I



NOTE: RA=research assistantship; TA=teaching assistantship.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

CONCLUSION

New S&E Ph.D.s commonly reported use of more than one mode of support for their graduate education. The average number of modes of support varies from 2.1 for the agricultural sciences to 2.9 for the social sciences, with an overall mean of 2.5. Five combinations of support modes were reported by just under 40 percent of all new S&E Ph.D.s in 1995. Two combinations—RA + TA and RA + own funds—accounted for about 20 percent of all combinations of modes. RA + TA + own funds and RA alone were the third and fourth most frequent combinations. TA + own funds was the fifth most frequently used combination of support modes.

Use of one or many modes of support, prevalence of particular modes of support, and use of particular combinations of support modes vary by S&E field, sex, race/ethnicity and citizenship, and type of institution. For example, nearly 75 percent of those in the agricultural sciences used one or two modes of support, but only 44 percent of those in psychology were covered by one or two modes. Asians or Pacific Islanders and noncitizens reported considerably fewer modes of support, on average, than did other groups. Ph.D.s attending public and private institutions used similar numbers of support modes but students attending Research I institutions reported using a larger number of support modes than those attending other institutions.

Changes in modes of support over time or differences among groups in types or combinations of support modes do not necessarily imply changes or differences in amounts of funding. In addition, other factors not examined in this study may affect support patterns. Such factors might include age, geographical location of institutions from which a degree is received, and part-time/full-time status of students.

The information provided in this study demonstrates the complex nature of graduate financial support. It indicates that those thinking either about the impacts of support modes on graduate S&E education or how to evaluate the impacts of specific graduate support programs for GPRA purposes need to take account of this complexity in their planning and deliberations.

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APPENDIX A. TECHNICAL NOTES

SURVEY DESCRIPTION

All statistical data presented in this paper are from the Survey of Earned Doctorates (SED). This survey, which is conducted annually under the sponsorship of the National Science Foundation (NSF) and four other Federal agencies, is a census of recipients of research doctorates at all accredited universities and colleges in the United States. Research doctorates include doctoral degrees such as the Ph.D. and D.Sc., but exclude first-professional degrees such as the J.D. and the M.D.

The survey data are collected directly from the individual research doctorate recipients. Questionnaires are distributed, with the cooperation of the various graduate schools, to those people completing their research doctorates. The data for a given year include responses from all persons whose doctorates were awarded in the 12-month period ending on June 30 of that year. A copy of the questionnaire used for the 1994-95 survey is attached as Exhibit A.

Approximately 94 percent of the 1994-95 cohort of doctorate recipients responded to the questionnaire. Since partial data from public sources are obtained for survey nonrespondents, the counts for conferred doctorates by field are considered relatively complete. Data for this report were drawn from the responses to items 5, 7, 9, 10, 13, and 17 of the 1995 questionnaire.

MISSING DATA

Missing data items are coded as missing and are not imputed. In item 17, respondents were asked to indicate their primary and secondary sources of support and to check all other sources from which support was received. The overall response rate to the sources of support was 94 percent, but only 76 percent reported a primary source of support and 63 percent a secondary source. That is, 63 percent indicated both a primary and secondary source of support, 13 percent indicated a primary source of support, but not a secondary source of support, and an additional 18 percent checked multiple boxes on the source of support question, but did not indicate which were primary or secondary sources of support. Thus, a total of 94 percent either checked a box and/or indicated one or more modes of support as primary or secondary. The 13 percent who indicated a primary source of support but not a secondary source of support includes both people who had no other support and also those who checked other sources of support, but did not designate a secondary source. Respondents not reporting any source are excluded from the tables presenting any source of support, those not reporting a secondary source are excluded from tables reporting secondary source of support, and those not reporting a primary source are excluded from tables reporting primary source of support. See appendix tables A2 and A3 for differences between those missing and not missing primary source of support and any source of support on other variables used in this report.

Item		Response rate (percent)
5	(Sex)	100
7	(Citizenship)	97.9
9	(Race/ethnicity)	98.9
13	(Field of study)	100.0
17	(Any source of support)	93.6
17	(Primary source of support)	76.2
17	(Secondary source of support)	63.2

VALIDITY OF DATA ON SOURCES OF SUPPORT

The National Research Council (NRC), at the request of the Federal sponsors of the SED conducted a study in 1994 to assess the validity of item 17, sources of support. In the study, responses to the SED were matched with records of grantors of support money to graduate students. The study found that doctorate recipients can reasonably accurately identify the type of financial support they had in graduate school (e.g., RA, TA) but not necessarily the source of that support (e.g., NSF, National Institutes of Health, Ford Foundation, university funds). (NRC 1994.) For this reason, the 32 possible responses to item 17 were recoded into 7 "modes" of support that reflect the type of funding but not the source of funding. (The question on sources of support was changed in later versions of the SED.)

DATA RECODES

Data from the file were recoded into the categories used in this report as follows.

Support mode was determined from item 17 as follows:

Mode	Code on questionnaire:
Fellowship	33[24], 53, 70, 71, 73, and 78
Traineeship	12, 21, 40, and 44
Research assistantship	11, 22, 32, 52, and 62
Teaching assistantship	10
Own funds	01, 02, and 03
Loans	80, 81, and 89
Other	14, 19, 29, 49, 60, 69, 90, 91, 92, and 99
Missing	None specified

Primary mode of support was determined from item 17, source indicated as primary; if no primary source was specified, it was considered missing.

Secondary mode of support was determined from item 17, source indicated as secondary; if no secondary source was specified, it was considered missing.

Discipline was determined from item 13, field of doctorate study. The National Research Council's Office of Scientific and Engineering Personnel field codes used to indicate study field were assigned to the discipline codes reported herein using the NSF Computer-Aided Science Policy Analysis and Research (CASPAR) database crosswalk shown in Exhibit B.

Citizenship was determined from item 7 using the following crosswalk:

Citizenship	Code on questionnaire:
U.S. citizen or permanent resident visa	0, 1, and 2
Foreign student (on temporary visa)	3
Missing	None specified

[24]A number of these may be "false positives." The NRC Validation Study (NRC 1994) showed that 39 percent of doctorate recipients listing NSF fellowship were not listed in the NSF files as having received one.

Race/ethnicity was determined from items 9 and 10, using the following crosswalk:

Race/ethnicity	Code on questionnaire:
American Indian or Alaskan Native (I)	Item 9, code 0; item 10, response "no"
Asian or Pacific Islander (A)	Item 9, code 1; item 10, response "no"
Black, non-Hispanic (B)	Item 9, code 2; item 10, response "no"
White, non-Hispanic (W)	Item 9, code 3; item 10, response "no"
Hispanic (H)	Item 9, any; Item 10, response "yes," codes 0, 1, or 2
Other (O)	None specified or multiple responses

Sex was determined from item 5:

Sex	Code on questionnaire:
Male	1
Female	2
Missing	None specified

Carnegie codes were assigned to the doctorate-granting institutions reported in item 13 based on the Carnegie classification system. (The Carnegie Foundation 1994)

- **Research I institutions** offer a full range of baccalaureate programs, are committed to graduate education through the doctorate degree, and give high priority to research. A Research I institution annually receives at least $40 million in Federal support and awards at least 50 doctoral degrees.

- **All other institutions** comprise the Carnegie classifications of Research II, and doctorate-granting I & II institutions.

The doctorate-granting institutions reported in item 13 were categorized as **public or private institutions** based on their reporting on the institutional control item in the National Center for Education Statistics IPEDS surveys.

- **Private institution** – an educational institution controlled by a private individual(s) or by a nongovernmental agency, usually supported primarily by other than public funds, and operated by other than publicly elected or appointed officials.
- **Public institution** – an educational institution whose programs and activities are operated by publicly elected or appointed school officials and which is supported primarily by public funds.

Table A1. Number of 1995 S&E Ph.D. recipients by primary source of support and selected characteristics[1]

Characteristic	Primary source of support								
	Fellowship	Traineeship	Research assistant-ship	Teaching assistant-ship	Own Funds	Loans	Other	Missing	Total
Total	667	1,797	8,069	3,748	4,582	430	1,951	6,621	27,865
Sex									
Female	251	768	2,112	1,130	1,965	246	529	2,130	9,131
Male	416	1,029	5,955	2,618	2,615	184	1,422	4,353	18,592
Unknown	0	0	2	0	2	0	0	138	142
Race/ethnicity									
White	449	1,234	4,417	2,289	3,571	347	1,265	3,050	16,622
Asian/Pacific Islander	86	362	3,231	1,260	732	21	417	2,237	8,346
Underrepresented minority[1]	123	178	324	167	251	60	224	569	1,896
Other (missing)	9	23	97	32	28	2	45	765	1,001
Citizenship									
Foreign students on temporary visas	71	256	2,464	1,082	602	13	770	1,981	7,239
U.S. citizens and permanent residents	596	1,540	5,598	2,666	3,978	417	1,179	4,067	20,041
Unknown	0	1	7	0	2	0	2	573	585
Institutional control[2]									
Private	327	894	2,286	881	1,358	226	677	2,110	8,759
Public	340	903	5,783	2,867	3,224	204	1,274	4,511	19,106
Carnegie classification[2]									
Not research I	607	1,436	6,505	2,708	2,756	181	1,398	4,488	20,079
Research I	60	361	1,564	1,040	1,826	249	553	2,133	7,786
Field of study									
Agricultural sciences	28	23	407	33	131	8	148	258	1,036
Biological sciences	172	829	1,676	567	586	27	310	1,209	5,376
Health sciences	14	97	167	92	473	24	104	359	1,330
Engineering	141	141	2,567	449	704	23	579	1,404	6,008
Computer & information sciences	26	28	318	152	193	3	80	197	997
Mathematics	27	39	132	566	101	2	70	253	1,190
Physical sciences	91	112	1,679	661	236	10	175	877	3,841
Earth, atmospheric, & oceanographic sciences	15	24	314	78	107	2	68	172	780
Psychology	42	178	396	368	1,114	263	159	909	3,429
Social sciences	111	326	413	782	937	68	258	983	3,878

[1] Underrepresented minority includes blacks, Hispanics, and American Indians/Alaskan Natives.

[2] of doctorate institution

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Table A2. Number and percentage of 1995 S&E Ph.D. recipients by primary mode of support missing, and selected characteristics

Characteristic	Number			Percentage		
	Primary source of support missing			Primary source of support missing		
	No	Yes	Total	No	Yes	Total
Total	21,244	6,621	27,865	76.2	23.8	100.0
Sex						
Female	7,001	2,130	9,131	76.7	23.3	100.0
Male	14,239	4,353	18,592	76.6	23.4	100.0
Unknown	4	138	142	2.8	97.2	100.0
Race/ethnicity						
White	13,572	3,050	16,622	81.7	18.3	100.0
Asian/Pacific Islander	6,109	2,237	8,346	73.2	26.8	100.0
Underrepresented minority[1]	1,327	569	1,896	70.0	30.0	100.0
Other (missing)	236	765	1,001	23.6	76.4	100.0
Citizenship						
Foreign students on temporary visas	5,258	1,981	7,239	72.6	27.4	100.0
U.S. citizens and permanent residents	15,974	4,067	20,041	79.7	20.3	100.0
Unknown	12	573	585	2.1	97.9	100.0
Institutional control[2]						
Private	6,649	2,110	8,759	75.9	24.1	100.0
Public	14,595	4,511	19,106	76.4	23.6	100.0
Carnegie classification[2]						
Not research I	5,653	2,133	7,786	72.6	27.4	100.0
Research I	15,591	4,488	20,079	77.6	22.4	100.0
Field of study						
Agricultural sciences	778	258	1,036	75.1	24.9	100.0
Biological sciences	4,167	1,209	5,376	77.5	22.5	100.0
Health sciences	971	359	1,330	73.0	27.0	100.0
Engineering	4,604	1,404	6,008	76.6	23.4	100.0
Computer & information sciences	800	197	997	80.2	19.8	100.0
Mathematics	937	253	1,190	78.7	21.3	100.0
Physical sciences	2,964	877	3,841	77.2	22.8	100.0
Earth, atmospheric, & oceanographic sciences	608	172	780	77.9	22.1	100.0
Psychology	2,520	909	3,429	73.5	26.5	100.0
Social sciences	2,895	983	3,878	74.7	25.3	100.0

[1] Underrepresented minority includes blacks, Hispanics, and American Indians/Alaskan Natives.

[2] of doctorate institution

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

Table A3. Number and percentage of 1995 S&E Ph.D. recipients by any mode of support missing, and selected characteristics

Characteristic	Number			Percentage		
	Any source of support missing			Any source of support missing		
	No	Yes	Total	No	Yes	Total
Total	26,086	1,779	27,865	93.6	6.4	100.0
Sex						
Female	8,577	554	9,131	93.9	6.1	100.0
Male	17,504	1,088	18,592	94.1	5.9	100.0
Unknown	5	137	142	3.5	96.5	100.0
Race/ethnicity						
White	15,981	641	16,622	96.1	3.9	100.0
Asian/Pacific Islander	8,028	318	8,346	96.2	3.8	100.0
Underrepresented minority[1]	1,784	112	1,896	94.1	5.9	100.0
Other (missing)	293	708	1,001	29.3	70.7	100.0
Citizenship						
Foreign students on temporary visas	6,849	390	7,239	94.6	5.4	100.0
U.S. citizens and permanent residents	19,217	824	20,041	95.9	4.1	100.0
Unknown	20	565	585	3.4	96.6	100.0
Institutional control[2]						
Private	7,981	778	8,759	91.1	8.9	100.0
Public	18,105	1,001	19,106	94.8	5.2	100.0
Carnegie classification[2]						
Not research I	7,177	609	7,786	92.2	7.8	100.0
Research I	18,909	1,170	20,079	94.2	5.8	100.0
Field of study						
Agricultural sciences	969	67	1,036	93.5	6.5	100.0
Biological sciences	5,098	278	5,376	94.8	5.2	100.0
Health sciences	1,212	118	1,330	91.1	8.9	100.0
Engineering	5,615	393	6,008	93.5	6.5	100.0
Computer & information sciences	936	61	997	93.9	6.1	100.0
Mathematics	1,121	69	1,190	94.2	5.8	100.0
Physical sciences	3,625	216	3,841	94.4	5.6	100.0
Earth, atmospheric, & oceanographic sciences	742	38	780	95.1	4.9	100.0
Psychology	3,103	326	3,429	90.5	9.5	100.0
Social sciences	3,665	213	3,878	94.5	5.5	100.0

[1] Underrepresented minority includes blacks, Hispanics, and American Indians/Alaskan Natives.

[2] of doctorate institution

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates

Table A4. Percentage distribution by field, race/ethnicity and citizenship of 1995 S&E Ph.D. recipients

Field	Asian/Pacific Islander [1]	Underrepresented minority [1, 2]	White [1]	Foreign on temporary visa [3]
Total S&E	100	100	100	100
Agricultural sciences	2	3	3	6
Biological sciences	25	19	21	13
Health sciences	2	8	6	3
Engineering	27	12	14	35
Computer & information sciences	4	1	3	5
Mathematics	6	2	4	5
Physical sciences	20	10	13	13
Earth, atmospheric, & ocean sciences	3	1	3	2
Psychology	3	24	19	2
Social sciences	8	20	14	15

[1] U.S. citizens and permanent residents only.

[2] Underrepresented minorities include blacks, Hispanics, and American Indians/Alaskan Natives.

[3] Foreign students who were on temporary visas at the time of Ph.D. conferral.

SOURCE: National Science Foundation/Division of Science Resources Studies, Survey of Earned Doctorates.

EXHIBIT A. SURVEY OF EARNED DOCTORATES, 1994–95
SAMPLE QUESTIONNAIRE

Form Approved, OMB No. 3145-0019 Approval Expires 6/95

SURVEY OF EARNED DOCTORATES 1994–95

Please return this form to the GRADUATE DEAN for forwarding to:
The Office of Scientific and Engineering Personnel, National Research Council • 2101 Constitution Avenue, N.W. Washington, D.C. 20418

Please print or type.

1. Name in full: _____ (Last Name) _____ (First Name) _____ (Middle Name)
Cross Reference: Maiden name or former name legally changed: _____

2. Permanent address through which you could always be reached: (Care of, if applicable) _____
_____ (Number) _____ (Street) _____ (City)
_____ (State) _____ (Zip Code) _____ (Or Country if not U.S.)

3. U.S. Social Security Number: ___ ___ ___ - ___ ___ - ___ ___ ___ ___

4. Place of birth: _____ (State) _____ (or Country if not U.S.)
Date of birth: _____ (Month) _____ (Day) _____ (Year)

5. Sex: 1 ☐ Male 2 ☐ Female

6. Marital status: 0 ☐ Single, never married 1 ☐ Married 2 ☐ Separated, divorced, widowed

7. Citizenship:
0 ☐ United States, native
1 ☐ United States, naturalized
Non-United States:
2 ☐ Permanent Resident of United States (Immigrant visa)
↳ _____ (Country of present citizenship)
3 ☐ Temporary Resident of United States (Non-immigrant visa)
↳ _____ (Country of present citizenship)

8. Are you a person with a disability? ☐ Yes ☐ No
If yes, is it: 1 ☐ Visual 2 ☐ Orthopedic (mobility) 3 ☐ Auditory (hearing) 4 ☐ Vocal 5 ☐ Other (specify) _____

9. What is your racial background? (Check only one.) 0 ☐ American Indian or Alaskan Native 1 ☐ Asian or Pacific Islander 2 ☐ Black 3 ☐ White

10. Are you Hispanic? ☐ No ☐ Yes → 0 ☐ Mexican American 1 ☐ Puerto Rican 2 ☐ Other Hispanic

11. How many dependents do you have? _____ Do not include yourself.
(Dependent = someone receiving at least one half of his or her support from you.)

EDUCATION

12. Location of high school/secondary school last attended: _____ (State) _____ (or Country if not U.S.)
Date of graduation from high school: _____ (Month / Year)

13. List below, chronologically, all colleges (including 2-year) and graduate institutions you have attended and each degree earned (if any). Be sure to give the years attended for ALL institutions attended. Include your doctoral institution(s) (and degree) at the end.

Institution/Branch	State/Country	Years Attended From	Years Attended To	Field of Study — Use Specialties List: Name	Field of Study — Use Specialties List: Number	Degree (if any): Title	Degree (if any): Granted Mo	Degree (if any): Granted Yr
EXAMPLE: Genesee Community College	NY	79	81	Math	498	—	—	—
SUNY/Buffalo	NY	81	83	Computer Science	400	B.S.	6	83

If a baccalaureate degree (or equivalent) was never received, please check box ☐

14. How many years were you a **full-time** student between receiving your first baccalaureate degree (or equivalent) and receiving your doctorate (include the period spent on your thesis and/or dissertation): _____ (whole numbers)

15. Identify the field of your dissertation research and enter below the title of your dissertation. If a project report or a musical or literary composition is a degree requirement in lieu of a dissertation, please check box ☐ Name of field _____ Number of field _____ (Use Specialties List)
Title _____

16. Name the department (or interdisciplinary committee, center, institute, etc.) and school or college of the university which supervised your doctoral program.
_____ (Department/Institute/Committee/Program) _____ (School)

NSF Form 558 June 1994

(continued on next page)

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17. Indicate your **primary** and **secondary** sources of support during graduate school by entering "1" or "2" in the appropriate box. Check (✓) all other sources from which support was received, if any. (Enter only one source as "1" and one source as "2.")

Own/Family Resources
01 ☐ Own Earnings
02 ☐ Spouse's Earnings
03 ☐ Family Contributions

University-Related
10 ☐ Teaching Assistant
11 ☐ Research Assistant
12 ☐ University Fellow
14 ☐ College Work-Study
19 ☐ Other
Specify

Federal Research Assistant
22 ☐ NIH
32 ☐ NSF
52 ☐ USDA
62 ☐ Other Federal
Specify

Other Federal Support
21 ☐ NIH Traineeship/Fellowship
29 ☐ Other HHS
33 ☐ NSF Fellowship
40 ☐ Patricia Roberts-Harris Fellowship — formerly G*POP (Department of Education)
44 ☐ Title VI Foreign Language

Other Federal Support (continued)
49 ☐ Other Dept. Education
60 ☐ Veterans Administration
53 ☐ USDA Fellowship
69 ☐ Other Federal
Specify

U.S. Nationally Competitive Fellowships (Non-Federal)
70 ☐ Ford Foundation
71 ☐ Rockefeller Foundation
73 ☐ Mellon Foundation
78 ☐ Other Fellowship
Specify

Student Loans
80 ☐ Guaranteed Student Loan (Stafford Loan)
81 ☐ Perkins Loan — formerly National Direct Student Loan
89 ☐ Other Loan
Specify

Other Sources
90 ☐ Business/Employer
91 ☐ Foreign (Non-U.S.) Government
92 ☐ State Government
99 ☐ Other
Specify

18. When you receive your doctorate degree, how much money will you owe that is directly related to your undergraduate and/or graduate education (tuition and fees, living expenses and supplies, transportation to and from school)?

0 ☐ None
1 ☐ $5,000 or less
2 ☐ $5,001-$10,000
3 ☐ $10,001-$15,000
4 ☐ $15,001-$20,000
5 ☐ $20,001-$25,000
6 ☐ $25,001-$30,000
7 ☐ $30,001 or more

19A. Please check the category that most fully describes your status for employment or study during the year immediately preceding the award of the doctorate

0 ☐ Full-time employed → Go to item 19B →
1 ☐ Held fellowship
2 ☐ Held assistantship
3 ☐ Part-time employed
4 ☐ Not employed
5 ☐ Other (specify)

B. If full-time employed, what type of position did you hold?

6 ☐ College or university, faculty
7 ☐ College or university, non-faculty
8 ☐ Elementary or secondary school, teaching
9 ☐ Elementary or secondary school, non-teaching
(11) ☐ Industry or business
(12) ☐ Other (specify)

POSTGRADUATION PLANS

20. How definite are your immediate postgraduate plans?

0 ☐ Am returning to, or continuing in, predoctoral employment
1 ☐ Have signed contract or made definite commitment
2 ☐ Am negotiating with one or more specific organizations
3 ☐ Am seeking position but have no specific prospects
4 ☐ Other (specify)

21. What best describes your immediate postgraduate plans?

Study (For **study** plans go to item 22)
0 ☐ Postdoctoral fellowship
1 ☐ Postdoctoral research associateship
2 ☐ Traineeship
3 ☐ Other study (specify)

(For **employment** plans go to item 23)
4 ☐ **Employment** (other than 0, 1, 2, 3)
5 ☐ **Military service**
6 ☐ **Other** (specify)

22. If you plan to have a postdoctoral fellowship, associateship, traineeship, or otherwise undertake further **study**,

A. What will be the field of your postdoctoral **study**? Please enter number from **Specialties List**.

B. What will be the main source of financial support for your study research?

0 ☐ U.S. Government
1 ☐ College or university
2 ☐ Private foundation
3 ☐ Nonprofit, other than private foundation
4 ☐ Other (specify)
6 ☐ Unknown

Go to item 24

23. If you plan to be **employed, enter military service** or **other**:

A. For what type of **employer** will you be working?

Education
a ☐ U.S. 4-yr college or university other than medical school
b ☐ U.S. medical school
c ☐ U.S. jr. or community college
d ☐ Elementary or secondary school
e ☐ Foreign institution

Government
f ☐ Foreign government
g ☐ U.S. federal government
h ☐ U.S. state government
i ☐ U.S. local government

Private Sector
j ☐ Nonprofit organization
k ☐ Industry or business
l ☐ Self-employed

Other
m ☐ Other (specify)

B. Indicate what your **primary** and **secondary** work activities will be by entering "1" or "2" in the appropriate box.

0 ☐ Research and development
1 ☐ Teaching
2 ☐ Administration
3 ☐ Professional services to individuals
5 ☐ Other (specify)

C. In what field will you be working? Please enter number from **Specialties List**.

Go to item 24

24. Where do you intend to live/work/study after graduation? 0 ☐ in U.S. _____ State 1 ☐ not in U.S. _____ Country

_____ City of Organization, if known

_____ Name of Organization, if known

25. What is the highest educational attainment of your mother and father? Please circle.

	Less than high school	High school graduate	Some college	Bachelor's	Master's	Professional	Doctorate
Father							
Mother							
Codes for office use	1	2	3	4	5	6	7

Signature _____ Date _____

If you would like a summary of the results of this survey, please check box ☐ (Available as funding permits.)

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EXHIBIT B. SPECIALTY FIELD CODES FOR THE SURVEY OF EARNED DOCTORATES, 1994–95, INCLUDED IN THE DISCIPLINE GROUPS REPORTED HERE

Exhibit B. Specialty Field Codes for the Survey of Earned Doctorates, 1994–95, Included in the Discipline Groups Reported Here

01 Agricultural Sciences
- 005 Animal Breeding and Genetics
- 010 Animal Nutrition
- 012 Dairy Science
- 014 Poultry Science
- 019 Animal Sciences, Other
- 020 Agronomy and Crop Science
- 025 Plant Breeding and Genetics
- 030 Plant Pathology
- 039 Plant Sciences, Other
- 043 Food Engineering
- 044 Food Sciences, Other
- 046 Soil Chemistry/Microbiology
- 049 Soil Sciences, Other
- 050 Horticulture Science
- 055 Fisheries Sciences and Management
- 066 Forest Biology
- 068 Forest Engineering
- 070 Forest Management
- 072 Wood Science and Pulp/Paper Technology
- 074 Conservation/Renewable Natural Resources
- 079 Forestry and Related Sciences, Other
- 080 Wildlife/Range Management
- 098 Agricultural Science, General
- 099 Agricultural Science, Other

02 Biological Sciences
- 100 Biochemistry
- 103 Biomedical Sciences
- 105 Biophysics
- 107 Biotechnology Research
- 110 Bacteriology
- 115 Plant Genetics
- 120 Plant Pathology
- 125 Plant Physiology
- 129 Botany, Other
- 130 Anatomy
- 133 Biometrics and Biostatistics
- 136 Cell Biology
- 139 Ecology
- 142 Embryology
- 145 Endocrinology
- 148 Entomology
- 151 Biological Immunology
- 154 Molecular Biology
- 157 Microbiology
- 160 Neuroscience
- 163 Nutritional Sciences
- 166 Parasitology
- 169 Toxicology
- 170 Genetics, Human and Animal
- 175 Pathology, Human and Animal
- 180 Pharmacology, Human and Animal
- 185 Physiology, Human and Animal
- 189 Zoology, Other
- 198 Biological Sciences, General
- 199 Biological Sciences, Other

03 Health Sciences
- 200 Speech/Language Pathology and Audiology
- 210 Environmental Health
- 212 Health Systems/Services Administration
- 215 Public Health
- 220 Epidemiology
- 222 Exercise Physiology/Science, Kinesiology
- 230 Nursing
- 240 Pharmacy
- 245 Rehabilitation/Therapeutic Services
- 250 Veterinary Science
- 298 Health Sciences, General
- 299 Health Sciences, Other

04 Engineering
- 300 Aerospace, Aeronautical, Astronautical Engineering
- 303 Agricultural Engineering
- 306 Bioengineering and Biomedical
- 309 Ceramic Sciences
- 312 Chemical Engineering
- 315 Civil Engineering
- 318 Communications Engineering
- 321 Computer Engineering
- 324 Electrical and Electronics Engineering
- 327 Engineering Mechanics
- 330 Engineering Physics
- 333 Engineering Science
- 336 Environmental Health Engineering
- 339 Industrial and Manufacturing Engineering
- 342 Materials Science
- 345 Mechanical Engineering

04 Engineering (continued)
348 Metallurgical Engineering
351 Mining and Mineral Engineering
357 Nuclear Engineering
360 Ocean Engineering
363 Operations Research
366 Petroleum Engineering
369 Polymer and Plastics Engineering
372 Systems Engineering
398 Engineering, General
399 Engineering, Other

05 Computer and Information Sciences
400 Computer Science
410 Information Science and Systems

06 Mathematics
420 Applied Mathematics
425 Algebra
430 Analysis and Functional Analysis
435 Geometry
440 Logic
445 Number Theory
450 Mathematical Statistics
455 Topology
460 Computing Theory and Practice
465 Operations Research
498 Mathematics, General
499 Mathematics, Other

07 Physical Sciences
500 Astronomy
505 Astrophysics
520 Analytical Chemistry
522 Inorganic Chemistry
524 Nuclear Chemistry
526 Organic Chemistry
528 Medicinal/Pharmaceutical Chemistry
530 Physical Chemistry
532 Polymer Chemistry
534 Theoretical Chemistry
538 Chemistry, General
539 Chemistry, Other
560 Acoustics
561 Chemical and Atomic/Molecular Physics
564 Elementary Particles
566 Fluids
568 Nuclear Physics
569 Optics
570 Plasma and High-Temperature Physics
572 Polymer Physics
574 Solid State and Low-Temperature Physics
578 Physics, General
579 Physics, Other
599 Miscellaneous Physical Sciences, Other

08 Earth, atmospheric, and ocean sciences
510 Atmospheric Physics and Chemistry
512 Atmospheric Dynamics
514 Meteorology
518 Atmospheric Science/Meteorology, General
519 Atmospheric Science/Meteorology, Other
540 Geology
542 Geochemistry
544 Geophysics and Seismology
546 Paleontology
548 Mineralogy and Petrology
550 Stratigraphy and Sedimentation
552 Geomorphology and Glacial Geology
558 Geology and Related Sciences, General
559 Geology and Related Sciences, Other
580 Environmental Science
585 Hydrology and Water Resources
590 Oceanography
595 Marine Sciences

09 Psychology
600 Clinical Psychology
603 Cognitive Psychology and Psycholinguistics
606 Comparative Psychology
609 Counseling Psychology
612 Developmental and Child Psychology
615 Experimental Psychology
618 Educational Psychology
620 Family and Marriage Counseling
621 Industrial and Organization Psychology
624 Personality Psychology
627 Physiological Psychology/Psychobiology
630 Psychometrics
633 Quantitative Psychology
636 School Psychology
639 Social Psychology
648 Psychology, General
649 Psychology, Other
672 Human/Individual and Family Development

10 Social Sciences
000 Agricultural Economics
650 Anthropology
652 Area Studies
658 Criminology
662 Demography/Population Studies
666 Economics
668 Econometrics

04 Engineering (continued)

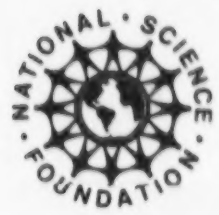
670 Geography
674 International Relations/Affairs
678 Political Science and Government
682 Public Policy Analysis
686 Sociology
690 Statistics (Social)
694 Urban Affairs/Studies
698 General Social Sciences
699 Other Social Sciences
710 History/Philosophy of Science and Technology
729 Linguistics
770 American Studies
773 Archeology
976 Public Administration

Non S&E (excluded from this report):

002 Agricultural Business and Management
700 History, American
703 History, Asian
705 History, European
718 History, General
719 History, Other
720 Classics
723 Comparative Literature
725 English and American Literature
726 English Language
732 Literature, American
733 Literature, English
734 English Language
736 Speech and Rhetorical Studies
738 Letters, General
739 Letters, Other
740 French
743 German
746 Italian
749 Spanish
752 Russian
755 Slavic (other than Russian)
758 Chinese
762 Japanese
765 Hebrew
768 Arabic
769 Other Languages and Literature
776 Art History/Criticism/Conservation
780 Music
785 Philosophy
790 Religion
791 Religion and Theology
795 Drama/Theater Arts
798 Humanities, General
799 Humanities, Other
800 Curriculum and Instruction
805 Education Administration and Supervision
807 Educational Leadership
810 Educational/Instructional Media Design
815 Education Statistics/Research Methods
820 Education Assessment, Testing, and Measurement
822 Educational Psychology
825 School Psychology
830 Social/Philosophical Foundations of Education
835 Special Education
840 Counseling Education/Counseling and Guidance Services
845 Education Evaluation and Research
850 Pre-elementary/Early Childhood Teacher Education
852 Elementary Teacher Education
856 Secondary Teacher Education
858 Adult and Continuing Teacher Education
860 Agricultural Education
861 Art Education
862 Business Education
864 English Education
866 Foreign Languages Education
868 Health Education
870 Home Economics Education
872 Technical and Industrial Arts Education
874 Mathematics Education
876 Music Education
878 Nursing Education
880 Physical Education and Coaching
882 Reading Education
884 Science Education
885 Social Science Education
887 Technical Education
888 Trade and Industrial Education
889 Teacher Education, Specific Academic and Vocational Programs, Other
898 Education, General
899 Education, Other
900 Accounting
905 Banking/Financial Support Services
910 Business Administration and Management
915 Business/Managerial Economics
916 International Business
917 Management Information Systems/Business Data Processing
920 Marketing Management and Research
930 Operations Research
935 Organizational Behavior
938 Business Management/Administrative Services, General

Non S&E (continued)

939 Business Management/Administrative Services, Other
940 Communications Research
947 Mass Communications
957 Communication Theory
958 Communications, General
959 Communications, Other
960 Architecture and Environmental Design
964 Home Economics
968 Law
972 Library Science
974 Parks/Recreation/Leisure/Fitness
980 Social Work
984 Theology/Religious Education
988 Professional Fields, General
989 Professional Fields, General
999 Other Fields



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